

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

First AERONAUTICAL
WEEKLY IN THE
WORLD

Founded in 1909 by Stanley Spooner

DEVOTED TO THE INTERESTS,
PRACTICE AND PROGRESS
OF AVIATION

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

No. 1337. Vol. XXVI. 26th Year

AUGUST 9, 1934

Thursdays, Price 6d.
By Post, 7½d.

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1.
Telegrams: Truditar, Watloo, London. Telephone: Hop 3333 (50 lines).

HERTFORD ST., COVENTRY.

Telegrams: Autocar, Coventry.
Telephone: Coventry 5210.

GUILDHALL BUILDINGS,
NAVIGATION ST., BIRMINGHAM, 2.
Telegrams: Autopress, Birmingham.
Telephone: Midland 2970.

260, DEANSGATE, MANCHESTER, 3.

Telegrams: Iliffe, Manchester.
Telephone: Blackfriars 1412.

26B, RENFIELD ST.,

GLASGOW, C.2.
Telegrams: Iliffe, Glasgow.
Telephone: Central 4857.

SUBSCRIPTION
RATES:

Home and Canada: Year, £1 13 0; 6 months, 16s. 6d.; 3 months, 8s. 3d.
Other Countries: Year, £1 15 0; 6 months, 17s. 6d.; 3 months, 8s. 9d.

Vulnerability

WOOLWICH ARSENAL, by which our football readers must not think that we refer to a certain team of professional Association players, is placed in about the most vulnerable spot in the British Isles. The Thames is a guide to hostile night bombers, and it is a marvel that in the late war the Arsenal suffered so little as it actually did. We can only discover from the official records that Woolwich was bombed twice. On October 13 five airships raided London by night, and one, the L14, commanded by the redoubtable Heinrich Mathy who was afterwards shot down by Second Lt. W. J. Tempest at Potters Bar, dropped thirty-two bombs on Woolwich, which caused nine casualties, one of whom died. Mathy did not even know that he was over the Arsenal, and reported that he had bombed the Victoria Docks. On February 16, 1918, a "Giant" aeroplane dropped five bombs on Woolwich (the Arsenal is not specially mentioned) which killed seven people and injured two others. There were other attacks on the place, but they failed to do any material damage. We could hardly expect the Arsenal to escape so lightly in another war.

The question of moving it has recently been raised in Parliament, accompanied by the specific suggestion that the Arsenal should be moved to Wales. The Government has stated that the question was reviewed ten years ago and is being considered again. It would certainly be a tremendous task to move such an organisation, and the expense would be high. When such a question crops up, we must remember that there are other places in the East of England which would be exposed to certain attack by air in the event of another war. Felixstowe and Martlesham are two such places. The Establishments which they house could not be left where they are if another war were to break out, and it is obviously better to make such moves in good time and at leisure, rather than in a hurry after the danger has developed.

It is sometimes said that even the Ultima Thule of the British Isles is now, or will soon be, within range of hostile bombers. That may be true, but it is still desirable to keep such tempting targets as far away as possible from the enemy. The farther the latter has to travel over our land, the greater chance has the defence of dealing with him, and the more chances there are of the enemy coming to grief from mechanical trouble, shortage of petrol, or suchlike causes. The greater the risk, the less stomach will the enemy pilots have for facing it.

"Our Frontier the Rhine"

THE Socialist Party's motions of censure on the Government's decision to increase the Royal Air Force were faithfully dealt with by Mr. Baldwin in the House of Commons and by Lord Londonderry in the House of Lords. Mr. Baldwin used a phrase which is likely to become historic. He said that for air defence our frontier was not now the white cliffs of Dover but the Rhine. It is a phrase to make people think and to bring home to them something of what is meant by air power. Also, for Mr. Baldwin is not a man to overlook the effect of his words abroad, this phrase is a friendly message to France and Belgium, and it will doubtless be duly noted in both those countries. It contains no threat of aggression to any Power beyond the Rhine, for it is impossible to picture Great Britain pursuing an aggressive policy anywhere. Lord Londonderry, in his speech in the Lords, quoted from a leading continental journal, whose comment on our new Air Force policy was: "All true friends of peace can congratulate themselves upon it, for everyone knows that the might of Great Britain is a pacific might." A determination to resist aggression is a very different thing; and a bold statement that aggression which would threaten our safety will not find us sitting with folded hands is a very great contribution to the peace of the world. Had we been more outspoken in that sense in

1914, who knows what tragedies might not have been averted?

The reasons put forward by both Government spokesmen for the increase of our Air Force were overwhelming, and must have convinced everyone except those who had made up their minds not to be convinced by any arguments. The train of reasoning by both speakers could not have been bettered. There was, however, a humorous side to one part of Mr. Baldwin's speech when he tried to explain away his unfortunate remark "The bomber will always get through." He evidently has studied his subject with more care in the two years since he committed himself so rashly, and he was quite successful in controverting the argument that if the bomber always gets through, then there is no object in air defence at all. Lord Londonderry was in a happier position, for he had no injudicious past to explain away,

and his little exposition of the principles of air defence was clear, and, again, should be convincing.

Unfortunately, some people who believe all that they read in the sensational section of the Press have come to the conclusion that the recent Air Exercises have proved that London is indefensible against air attack. To such people it seems almost useless to reiterate that the Air Exercises could not, and did not, prove that or the reverse, for the simple reason that there was no attempt made to put the matter to the test. They were mere exercises, or practice, of the same nature as practice on a punch-ball by a boxer in training. The bomber will not always get through, but admittedly sometimes he will. With the Rhine as our frontier, it is reasonable to conclude that the number of bombers which will reach London (if there should ever be another war) will be considerably curtailed.



"SITTING DOWN": The latest type of Autogiro (7-cyl. Siddeley "Genet Major") touches down with its tail wheel first when coming down steeply. An article on "Flying the Autogiro" will be found on pages 813-816. (*Flight Photo.*)

The Outlook

A Running Commentary on Air Topics

Monoplane or Biplane

ALTHOUGH the controversy monoplane or biplane is almost as old as flying itself, it must be conceded by the staunchest biplane advocates that if the monoplane can be made of the same structure weight most of the biplane advantages disappear. If the monoplane can be made lighter than the corresponding biplane its claims to consideration become considerable.

From a superficial consideration of the subject, one might readily reach the conclusion that as the biplane offers by far the greater depth of structure, it must *ipso facto* be the lighter. This would be so were it not for the fact that in a biplane it is extremely difficult, due to the concentrated loads, or rather supports, and use of fittings, to design for uniform distribution of stress. Some part of the structure must be stronger than necessary, which is merely another way of saying that the structure is heavier than it need be. There are some designers who claim, and not without a certain amount of justification, both theoretical and practical, that the cantilever monoplane offers possibilities of achieving almost complete uniformity of stress intensity. When, however, it comes to discussing ways and means, there is by no means unanimity of opinion. Some hold that a multi-spar wing with stressed covering is the best solution. Others claim that this is a complicated engineering job, and that a better way is to have a single spar and to make that single member, either by itself or by the addition of a certain amount of bracing, take all bending, shear and torsion loads. A novel method of doing this is described in this issue. In the Blackburn-Duncanson wing a single tubular spar of circular cross-section not only takes all the wing loads but it also serves as the main petrol tank. Calculations supported by practical tests show this type of wing to be very light, and at the same time to have a remarkable torsional stiffness.

Controllable Pitch Propellers

OPINIONS of the value of controllable pitch propellers differ considerably. One school refuses to see in them any practical use at all, while others, rather more moderate in their views, admit that in certain special cases the controllable pitch propeller may be worth while. In this issue we publish an article by Capt. C. C. Walker and Mr. R. M. Clarkson, in which the subject is dealt with in a very interesting manner. The article is by no means of a "technical" nature, and the general arguments can be followed by anyone who realises that the ability of being able to vary the pitch of an airscrew confers upon the aeroplane very much the same sort of advantages as those which the gearbox gives to a motor car. Imagine a fixed gear of high ratio as being represented by the airscrew with large pitch for high speed, and the very slow start is easily understood. The coarse pitch prevents the aero engine from reaching high speed while the machine is travelling slowly over the ground for the take-off. The analogy should not be pushed too far, but it will convey to readers with no great knowledge of airscrew problems a very good idea of the fundamental questions involved.

Capt. Walker and Mr. Clarkson put up a very good case for the controllable pitch airscrew. We do not, however, imagine that all will agree entirely with them, and the more technically minded of our readers may like to put up counter arguments. For example, it does seem just

possible that the manner in which the particular r.p.m. for cruising are obtained may have not unimportant effects on the engine. At present the engine manufacturer recommends certain r.p.m. for cruising, knowing that when the engine is *throttled* to that speed his engine will go on running for very long periods. If full throttle is to be used and the r.p.m. held down by the pitch of the airscrew, the engine manufacturer may decide to recommend lower r.p.m. This is a question to be settled mainly by engine experts.

This Railway Business

ONLY the most optimistic of operators can have imagined that neither the railways nor the shipping companies would, sooner or later, enter the field of commercial aviation. Five years ago there was hardly a machine that could be run on a regular route to show a profit even with a full load, and certainly there was not the public interest to provide this full load.

The unbiased outsider can hardly blame the railway companies for coming in now that they can see the possibility of profit, or even for making a premature appearance in the hope of discouraging mushroom concerns which might develop an expensive "nuisance value." There is little room for sentiment in modern business, however one may sympathise with the pioneers who have helped to foster public interest through more than difficult times.

There is, however, one aspect of the affair which may encourage the State to "see fair play."

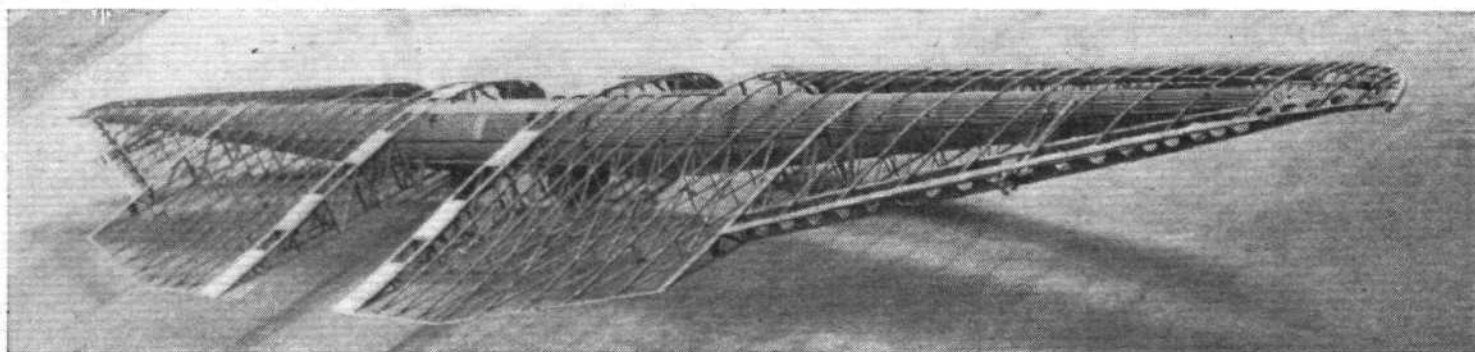
There can be little doubt that a concern such as Railway Air Services, Ltd., with its strong financial background, can, if it so wishes, squeeze out many smaller operators, and its entry into the field may, in any case, discourage prospective investors. A single company in its search for economy and efficiency is likely to standardise its fleet as far as possible, and will, therefore, give its orders to one aircraft firm.

Half a dozen separate concerns would, on the other hand, have different ideas, and would, in any case, buy machines suitable for their own needs. A greater number of machines would be purchased, and the orders would be spread more evenly over the whole trade. Each manufacturer would be encouraged to do his utmost, and, even if his own machine was not ordered, would have a design ready for sale abroad.

If, therefore, we consider "the greatest good for the greatest number," the possibility of an air line monopoly can be considered to be a bad thing. It can only be hoped that the railway company meant what it said when it disclaimed any intention of "squeezing the other fellow out." We can think of one or two private operators who have a great measure of public confidence and a healthy contempt for any possible competitor. The difficulties of a particular route are not discovered and surmounted in a day.

Flights Over the Sea

A RECENT Notice to Airmen lays it down that a new regulation is to be established whereby landplanes carrying paying passengers must not fly over the sea in such circumstances that if the engine, or one of the engines, stops the machine cannot reach land. This will stop single-engined aeroplanes carrying paying passengers across the Channel except at great height, and may have far-reaching effects on the power-surplus of multi-engined aeroplanes.



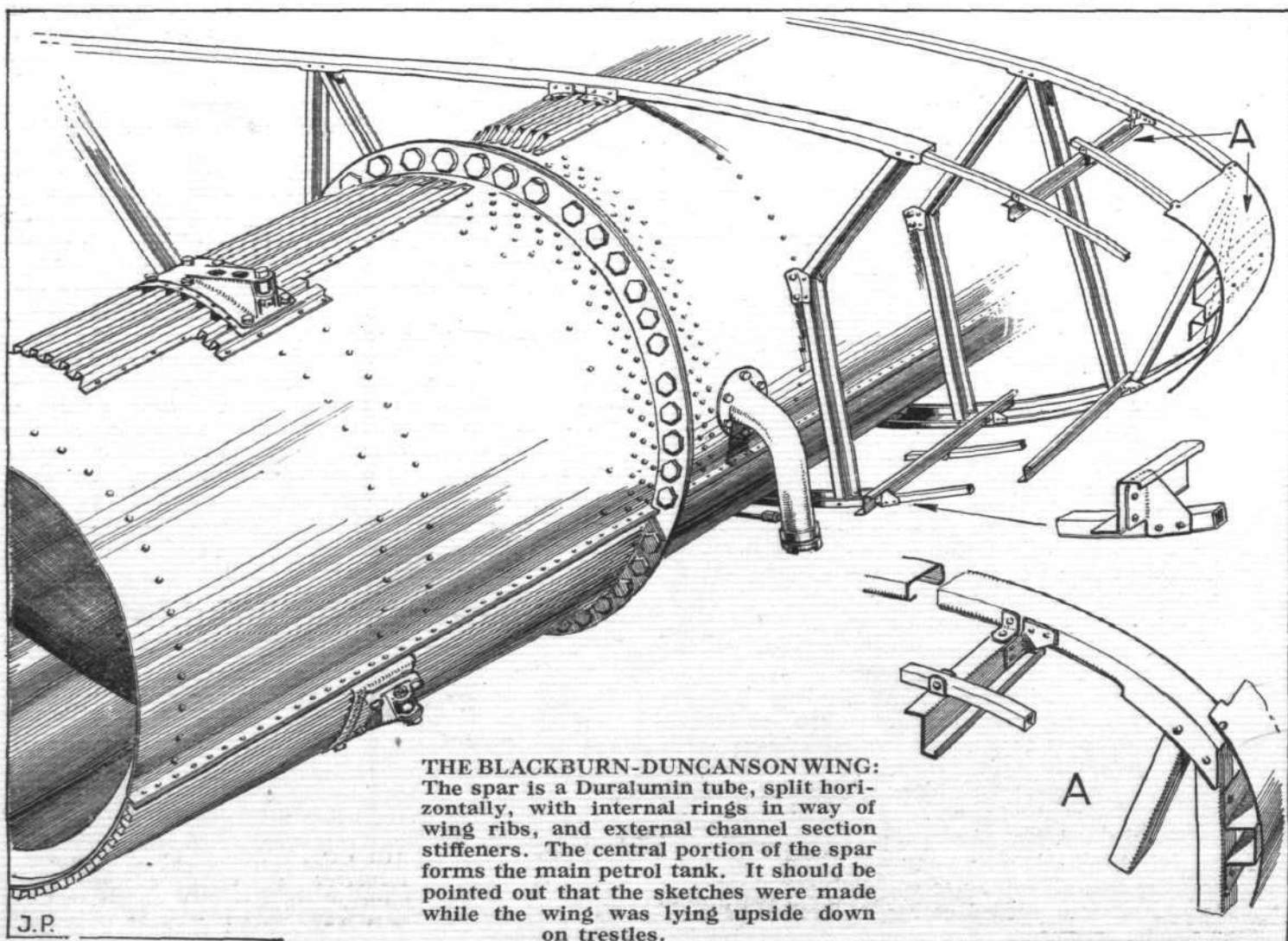
A NEW SINGLE-SPAR WING

In the Blackburn-Duncanson System the Single Tubular Spar Also Forms the Petrol Tank

SOME years ago Mr. F. Duncanson, who was at that time on the technical staff of the Gloster Aircraft Company, Ltd., undertook a mathematical investigation into the bending and torsional problems of cantilever wings. Some of his results formed the basis of an article published in *The Aircraft Engineer* (Monthly Technical Supplement to *Flight*) on June 27, 1929. These investigations led to the discovery that a single tapering tubular spar located in the thickest portion of a wing section offered great possibilities of weight-saving. Mr. Duncanson has since joined forces with the Blackburn company at Brough, and has there translated his theoretical work into practical wing construction, the Blackburn-Duncanson

single-spar wing being the result. By way of a first full-scale flying test, a wing was designed and built for the Blackburn "Segrave" monoplane. Extensive flying tests have now been made with this machine, and the results have been fully up to expectations. The wing has not only proved strong in plain bending but has been found quite exceptionally stiff in torsion, which is, perhaps, of even greater importance in a cantilever monoplane wing. At the same time a very considerable saving in structure weight was achieved.

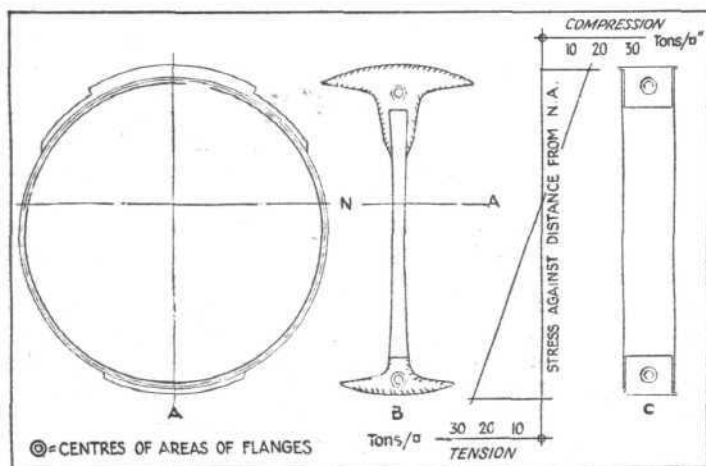
Without its cabin furnishings the Blackburn "Segrave" in its original form had a tare weight of 2,246 lb. When the single-spar wing was substituted for the original wooden



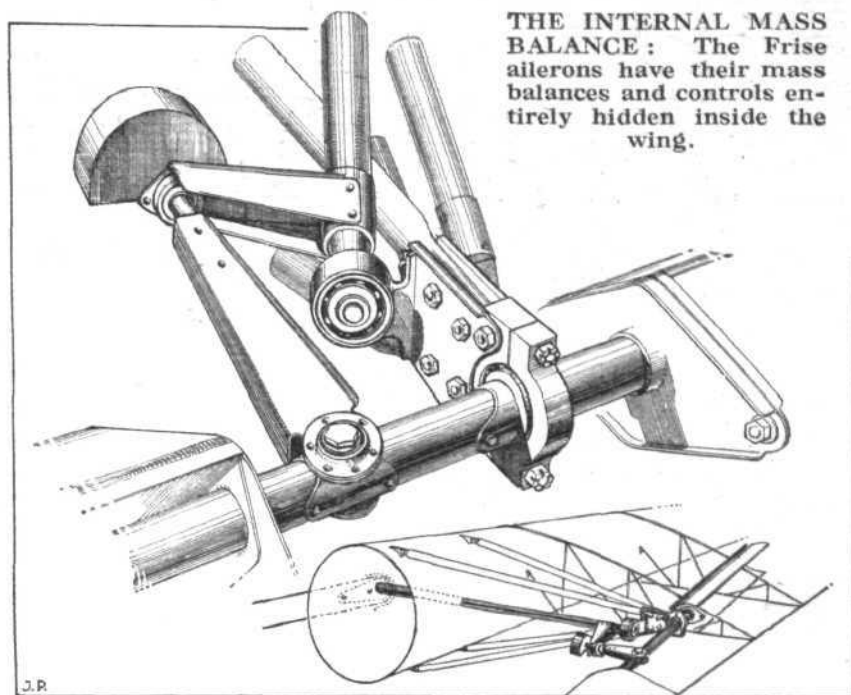
THE BLACKBURN-DUNCANSON WING: The spar is a Duralumin tube, split horizontally, with internal rings in way of wing ribs, and external channel section stiffeners. The central portion of the spar forms the main petrol tank. It should be pointed out that the sketches were made while the wing was lying upside down on trestles.

two-spar wing, the tare weight dropped to 1,971 lb. The weight of the original wing was 563 lb., and the petrol tanks accounted for another 55 lb., giving a combined wing and tank weight of 618 lb. The weight of the single-spar wing, which also serves as the main petrol tank, is 358 lb., so that the total weight saving is no less than 260 lb., or 42 per cent. It may be observed that an even lower wing weight could have been achieved had it not been for the fact that a large braced framework had to be used for attaching the wing to the old two-spar fittings on the fuselage. It is of interest to mention in this connection that the cabin accommodation of the "Segrave" is now being altered so that the machine will become a five-seater (pilot and four passengers), the wing weight saved having permitted this additional useful load. The Blackburn company is now prepared to grant licences on reasonable terms for the patent and design rights of the tubular single-spar construction.

Simplicity is the keynote of design in the Blackburn-Duncanson single-spar wing. The spar itself consists of a circular-section Duralumin tube built up of two halves, with internal rings to stabilise the material, and external corrugated reinforcements on top and bottom of the spar, the reinforced area being larger on top than underneath, owing to the fact that the top flange is working in compression. At present the fact that the spar is tapered while the pleats or corrugations in the reinforcements are parallel causes some little inconvenience in manufacture, but when the wing goes into production and does not have to be "hand made," this difficulty will be overcome.



MASS DISTRIBUTION: The Blackburn-Duncanson spar as actually made is shown on the left, at A. B shows the same quantity of material concentrated on the vertical axis in what would be the equivalent I-section beam. At C is shown the proportions of a Warren girder. This would need additional structure to stabilise it against torsional loads.



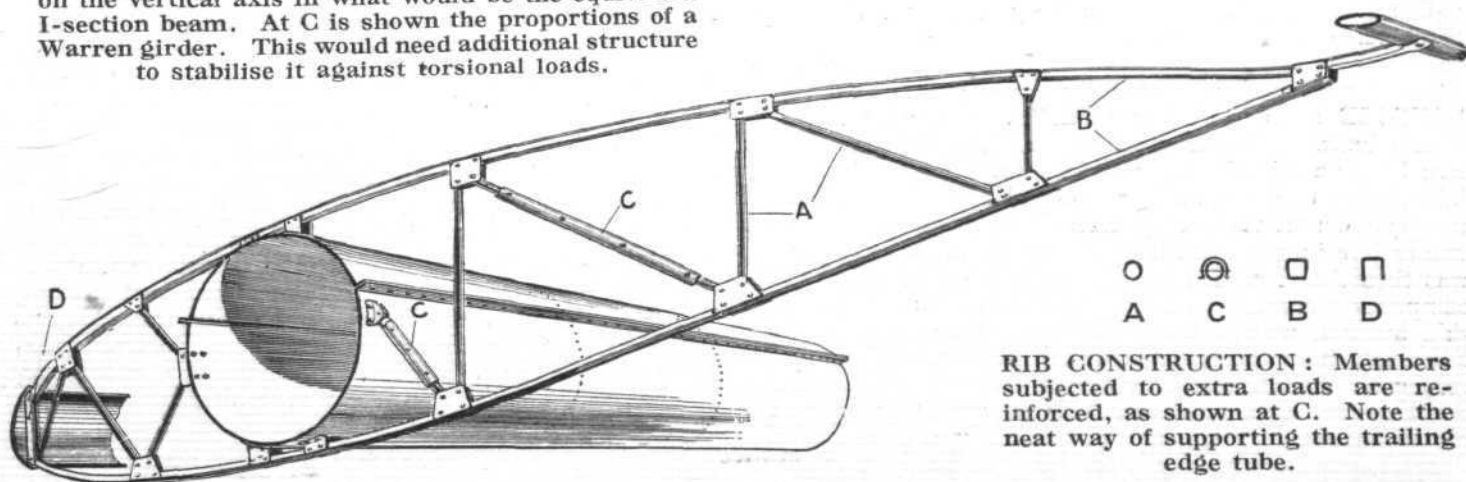
THE INTERNAL MASS BALANCE: The Frise ailerons have their mass balances and controls entirely hidden inside the wing.

Having a larger area of corrugations on top of the wing than on its underside results, of course, in displacing the neutral axis of the spar, and the flanges of the horizontal joint between the two halves of the spar are therefore not on the maximum diameter of the spar section, but some little distance above it.

Attachment of the wing ribs to the spar is very simple, as shown in our sketches. The internal rings or formers occur in the plane of the ribs, and the latter are attached by simple angle plates, riveted through the spar wall and flange of internal ring. Another neat feature of the wing, which need not be confined to a single-spar structure, is the attachment of the trailing edge. As one of the sketches shows, only the top boom of the rib is carried back to the trailing edge. In this way a very simple and neat joint results.

Very substantial flanged joints are used for securing the outer wing portions to the centre section of the tubular spar which serves as the main petrol tank, and after several months of flying the machine in all sorts of weathers not the slightest trace of "weeping" has been detected. This is probably due to the fact that for structural reasons the spar has to be of a much thicker gauge than would be needed for any tank.

That the tubular single spar forms an efficient beam is indicated by the diagrams on the left. At A is shown the distribution of material in the spar as actually made. At B the same amount of material is shown concentrated to form an I-beam, while at C are shown the proportions of a Warren girder. The latter would need the addition of a torsion-resisting structure, while the tubular spar is, of course, particularly well suited to take twisting stresses.



RIB CONSTRUCTION: Members subjected to extra loads are reinforced, as shown at C. Note the neat way of supporting the trailing edge tube.

PRIVATE FLYING

A SECTION FOR OWNER-PILOTS
AND CLUB MEMBERS

THE private aircraft owner has a vehicle which can be made to contribute a great deal of enjoyment during his periodic holidays. The rapidly increasing internal air lines are bringing the time-saving advantages of aviation to a growing section of the public, and this is all to the benefit of the private owner. Those who are able to influence the provision of ground facilities will generally move more rapidly in response to commercial requirements, and the same facilities will be of advantage to the owner pilot. The motorist can hardly be said to have had his lot improved by the incursion of the motor coach on the roads of this country, but the possessor of an aeroplane is more happily placed in that one cannot visualise for many a year to come any substantial overcrowding of the highways of the air.

Internal and "semi-internal" air routes now being developed demonstrate a saving of time which cannot fail to emphasise to the private owner the advantages he possesses in being able to use his machine for rapid transport to those holiday centres which are less accessible by the usual means of surface transport.

The growing interest of municipal authorities in aviation has been brought very much to my notice during the past week, when I paid visits to four towns whose authorities were anxious to have advice on suitable aerodrome sites. In this connection I found it necessary to keep two engagements, one in the extreme North and the other in the South, on one day. As this involved about a thousand miles' flying, I took the opportunity of trying out a friend's "Leopard Moth," which gives a cruising speed of 10 to 15 m.p.h. more than my own machine. I found it very nice to fly, the controls being very responsive. The cabin is a considerable improvement on that of the "Puss Moth," and it seats three persons very comfortably. The accommodation for luggage is also much better, as this is housed in a compartment behind the back seat. Fitted with a "Gipsy Major" engine, its petrol consumption at five and a half to six gallons per hour is quite good, and giving, as it does, twenty miles to the gallon, it certainly makes a very economical family machine.

A Desirable Fitment

I MISSED my own "Puss Moth" very considerably on this journey for one good reason. The "Leopard" is fitted with a tail wheel instead of a skid, but, although an improvement, it cannot be considered to be entirely satisfactory. On arriving at my destination on the South Coast rather late in the evening, I landed on the sands, and it was then that I wished for my own tail wheel unit. This comprises a specially designed fork which fits to the tail skid bracket, with a low-pressure wheel of ample proportions, and is an arrangement which has not only proved a very good shock-absorbing medium, but one which makes the machine very controllable even on the softest ground. By comparison, I found that the tail wheel on the "Leopard Moth," having a very narrow tread, embedded

itself so deeply in the sand that it took three men to manhandle the machine into position for taking off. When attempting to manoeuvre the aeroplane under power I found the difficulty accentuated. This is a very important feature for the private owner, as a machine designed for his use should be capable of being easily handled under all normal conditions without any outside assistance. If any of my readers are interested in this fitment, which was designed to meet my own requirements, I shall be glad to supply them with further particulars.

Flying Abroad

ALTHOUGH one would recommend, from many points of view, that aircraft owners should concentrate on the exploration of their own country, there is no doubt that a great deal of good can be done by flying visits abroad. Particularly is this the case when an interchange of visits between British and foreign flying clubs is arranged. Not only are international relations improved by this means, but the advantages of our own light aircraft can be demonstrated in potential markets to the benefit of the industry at

large. Such occasions can be utilised by what may be termed "private formation flying" under the leadership of a more experienced pilot to increase the novice's knowledge of course setting and navigation. A tour of this nature, under expert guidance, will also give such pilots a greater insight into those points of etiquette which should be observed when flying in different foreign countries. The more experienced pilot will choose an airport where he can clear Customs with the least possible waste of time. For example, when entering France, if such formalities are carried out at one of the less-frequented Customs aerodromes near the coast, rather than at Le Bourget, he may be saved considerable inconvenience.

In touring abroad by air, the facilities offered by our leading oil companies by the issue of petrol carnets are not as well known as they might be. This is a very sound arrangement, and enables the pilot to obtain supplies of fuel at most centres on a system of credit, which obviates the necessity for carrying a supply of currency, the consumer being charged up periodically for fuel at his home address.

While on the subject of fuel, I would remind the tourist that the tax on the petrol in his tanks can be claimed at the time of clearing Customs on leaving this country. This necessitates the use of the requisite form, and the rebate will be returned in due course, although, unfortunately, this takes some considerable time, as the authorities must see that the suppliers of the petrol in question have paid the duty in the first instance. It must not be forgotten, either, that petrol brought into this country may also be taxed at the standard rate. Although this does not seem to be consistently imposed, a pilot should not overlook the regulation, and, unless he welcomes the opportunity of assisting the revenue, he will see that there is no great surplus of fuel in his tanks when he arrives at the Customs port.

NOTES

by

LORD SEMPILL

A.F.C., F.R.Ae.S.

Private Flying**An Old Boys' Flying Club**

THE formation of the Old Etonian Flying Club, which is probably the only one of its kind, was an interesting development of the flying club idea, and the example thus set will undoubtedly be followed by old boys of other public schools. The success of this club, which has a membership of about two hundred, at least one hundred being flying members, is very largely due to the indefatigable efforts of the hon. secretary, Mr. J. A. H.

Parker, the son of the Editor of *The Field*. I had the pleasure of attending an enjoyable rally of the Club members at Drokes, on the Beaulieu River, arranged at the invitation of Mr. H. S. Burge recently. Twelve machines of various open and closed types, flown by members, and including an Autogiro, put in an appearance, and contributed to a very successful afternoon. The club, which owns its own training machine, has its headquarters at Heston, where it is able to operate on a very economical basis in the interests of its membership.

RACING AT DEAUVILLE

Caudron "Rafales" take the first six places in the Grand Prix, the winner, Puget, averaging 168.07 m.p.h. for the 1,036 miles

EIGHT two-seater light aeroplanes took off from Deauville aerodrome at one o'clock on Saturday, July 21, on the first part of the two-day contest for the Grand Prix and the Esders Cup. The event was open to international entries, but all, save one "Leopard Moth" registered in France, were French, and six of them were Caudron "Rafales" (140-150 h.p. Renault "Bengali" engines) which, it will be remembered, was so successful in the twelve-hour race at Angers. The eighth entry was a Farman cantilever monoplane, type 359, with a "Gipsy Major" engine.

The contest was limited to single- and two-seater land machines, with engines of less than eight litres capacity, and became simply a battle between the Caudron pilots.

Lacombe, winner of the Angers event, led at the end of the first 518-mile leg to Cannes, having averaged 166 m.p.h., and there was only a quarter of an hour between all three.

On the following afternoon the six Caudrons continued in the lead, and, in spite of bad weather over the Alps and in the Rhone Valley, even improved their times on the outgoing trip.

Jacques Puget, an amateur pilot, covered the whole distance in 6 hr. 9 min. 56 sec. at an average speed of 168.07 m.p.h., with Lacombe second at 161.53 m.p.h., and M. George Signerin, a Breguet test pilot, third at 153.22 m.p.h. The Farman 356 arrived seventh at 116.53 m.p.h., and the unfortunate de Ceurtivon (D.H. "Leopard Moth") finished just two seconds beyond the strict time limit.

The Esders Cup is to be awarded after the third year's Grand Prix to the contestant having made the best time in any of the three races flown during the period.

The Caudron "Rafale"

The Caudron two-seater "Rafale" is a low-wing cantilever monoplane with split trailing edge flaps. Its span is 30.2 ft. and its length is 24.3 ft. A cantilever landing gear is used, having independently sprung wheels with magnesium alloy fairings.

A new type Renault "Bengali" engine, in which the compression had been raised from 5.3 to 6.1 to 1 and the r.p.m. had been increased from 2,200 to 2,450, was used. Through these changes the new engine, which is of inverted four-cylinder direct-drive type, gave 140 h.p. at cruising and 150 h.p. at maximum speeds, and the weight, with fuel pumps, was 298 lb. Raker automatic variable pitch propellers, adjustable in flight, were also used.

R. C. W.



The Caudron "Rafale," which, piloted by Lacombe, won the Deauville-Cannes leg of the race and finished second in the final classification. This machine won "Les Douze Heures d'Angers."

FROM THE CLUBS**Events and Activity at the Clubs and Schools****LEICESTERSHIRE**

During last month no fewer than 67 cross-country flights have been made, and 51 machines have visited Desford. A certain amount of night flying has added to the interest.

MIDLAND

At Castle Bromwich last week, in spite of high winds, cross-country flights were made to Desford, Blackpool, Carlisle, Renfrew, Heston, Reading, and Brooklands.

LINCOLNSHIRE

At the Aero Fair and Gala on August 31 and September 1 there will be air and ground events. Entries for the air races, for which cash prizes are being given, are invited.

YORKSHIRE

On July 22 members of the Yorkshire Aeroplane Club, accompanied by the Lord Mayor of Leeds and Bradford, and by members of the aerodrome committee, flew to Thornaby-on-Tees for a "return" luncheon given by No. 608 (County of York) Bombing Squadron.

WITNEY AND OXFORD

The second "Moth," with a cream-and-black colour scheme, is now in use at Witney, and last week's flying totalled twenty-three hours.

LIVERPOOL

During a month in which high winds have often curtailed flying, the Liverpool Club has managed 361 hr. 30 min. This brings the total since January up to 1,637 hr. 40 min.—a creditably high figure.

HATFIELD

Flt. Lt. Johnson, unfortunately, did not succeed in his attempt to win the S.B.A.C. Challenge Trophy again for the London Aeroplane Club. Two members, Messrs. Malmstrom and Christiansen, left last Thursday, by air, for Sweden.

HULL

The agreement with the Hull Corporation has at last been signed, and the formation of the new Hull Aero Club (1934), Ltd., is now proceeding. Since the Hull Aero Club came into existence on March 2, 1934, 172 hours have been flown. The club magazine has proved to be a great success, and the issue has been increased considerably.

Private Flying

CAMBRIDGE

High winds on several days last week made solo flying by pupils of Marshall's Flying School impossible, but several members took advanced dual instruction in rough-weather flying. Charter flights have been made to Birmingham and Norwich.

HERTS AND ESSEX

Several "international" cross-country flights have been carried out recently. Miss "Paddy" Hamilton, from U.S.A. (aged nineteen), flew to Manchester and Brussels, Mr. J. H. Van, from Canada (also aged nineteen), flew to Amsterdam, and Mr. W. J. Alington flew to Devonshire. All competitors have now completed the cross-country course for the "Sheldermine" Challenge Bowl, and a final will be flown shortly.

BROOKLANDS

In view of the amount of work in hand it has been decided to extend the present workshops, and building operations will commence in the course of the next week or two. It is interesting to note that the repair shop was first started by Mr. Massey in 1929, and the floor space was then 6,000 sq. yds. The area with the new extension will cover 20,000 sq. yds.

CARDIFF

Mr. J. D. Rose is acting as chief instructor while F/O. Cope has a month's well-deserved holiday.

CINQUE PORTS

Last Saturday night there was a rush charter job to Le Touquet. A gentleman had missed his boat at Folkestone, and decided to fly. He left Lympne at 8.15 p.m., and Mr. Waller made a night landing on his return at about 9.45 p.m.

The Cinque Ports Club apologises to private owners who may not receive notices of the International Meeting and Races on September 1 and 2, although every effort will be made to see that there are no omissions.

SUSSEX

A Miles "Hawk" has been added to the school at Wilmington, and the "Fox Moth" has done an encouraging amount of charter work recently. The "Hawk" may be chartered by anyone with an "A" licence and 50 hours solo to his or her credit for £3 per day, other than at the week-ends.

Interesting visitors have included Flt. Lt. and Mrs. Schofield with the King's Cup Monospar, Mr. Hordern with the Klemm "Eagle," a smart Caudron "Phalene," and Sir Alan Cobham's refuelling "Courier."

AIR SERVICE TRAINING AT HOME

The Final of the A.S.T. Flying Trophy Competition

IT is always a problem to know how much flying there ought to be in the programme of the annual meeting, or At Home, held by a flying club. In the past, when flying displays were something of a novelty, it was usual to make flying the be all and end all of the meeting, but now that people have become a trifle *blasé* there is a great deal in favour of cutting down the flying to a few items only. Those items must, however, be of the very best.

A.S.T., who held their first At Home at Hamble last Friday, wisely made the occasion one, primarily, of social entertainment for their guests, with the result that everyone enjoyed it, and no one could complain of a long and tedious flying programme, with its inevitable repetition and waits.

The flying was limited to the final of the competition for the Air Service Training Flying Trophy presented by Mr. R. E. Gardner, and to a demonstration of inverted and aerobatic flying. The competition, which was open to the A.S.T. students, consisted of a map-reading trial, followed by an aerobatic test. The map reading had already been flown off before the At Home, as had the eliminating aerobatic tests. The final lay between four students, Messrs. Coull, Wetham, Wallace and Kennedy, and the first named proved the winner by a narrow margin. The aerobatics were for the most part clean and accurate, and were an excellent testimonial for the training at Hamble.

The demonstration was by two of the A.S.T. flying instructors, Flt. Lt. J. B. Veal and F/O. J. Beaumont. This couple have already been seen at the R.A.F. Flying Club Display at Hatfield, and the excellence of their flying commented upon in *Flight*. It would be difficult to over-praise the cleanliness and smoothness of their display. They were flying Avro "Tutors" with "Lynx" engines, which naturally gave them more scope than did the smaller-engined Avro "Cadets" used by the pupils in the previous aerobatics. Moreover, their engines were arranged to run inverted. One pilot flies directly behind the other, but manages to handle his machine in a wonderfully smooth manner either on its back or when rolling, despite the slip stream from his leader.

After tea a variety of competitions and sideshows amused

the guests. One of the chief attractions was a water polo match between an A.S.T. team and one from the R.A.F. sea-plane base at Calshot. This was the first occasion on which the new swimming bath had been used, and, fittingly enough, it was celebrated by a win for the home team, A.S.T. obtaining 5 goals and Calshot 1 goal. During the afternoon there had been an arrival competition for visiting aeroplanes, the winner being Sir Rupert Brooke, and there was also a *concours d'élégance* in which the prize was given to the best-kept aeroplane, having regard to its age and the amount of flying it had done. This was won by Mrs. Battye with her four-year-old "Moth" (Gipsy I).



THE WINNER: Lady Siddeley presenting the Gardner Trophy to Mr. R. M. Coull.

New British Gliding Records

On Sunday Mr. G. E. Collins made a sailplane flight from Dunstable Downs to the Norfolk coast, covering a distance of 95 miles and breaking the British distance record for gliders. He took off at 11 a.m., gained height in the vicinity, and reached Wells-next-the-Sea at 3 p.m. This flight was 40 miles longer than the previous record set up by Mr. P. A. Wills.

At Sutton Bank, Mr. Wills, curiously enough, while taking part in the inaugural meeting of the National Gliding Centre, reached a height of 5,100 ft. above his starting point, and 6,000 ft. above sea level, thus beating his own British record of 4,600 ft.

The world's distance record, incidentally, made by Heini Dittmar last month, is 235 miles.

Irish Aviation Day

Owing to the Dublin newspaper strike, which has already left the city without newspapers for nearly a fortnight, the Irish Aviation Day, which was to have taken place in the Phoenix Park, Dublin, on August 18, has been postponed.

A Tour in Hungary

Starting from Budapest airport on September 16, an air tour of Hungary, the first of its kind, is being arranged by the Magyar Touring Club, who have asked the Automobile Association to assist in the organisation. The route will include Lillafüred, with trout fishing, Hortobágy, the "Wild West" of Hungary, Lake Balaton, where the peasants celebrate the harvest of the grapes, and Budapest.

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —

IF WINTER COMES . . . ?

Operators of internal air lines have flown with commendable regularity during one of the finest flying summers this country has known. Now is the time to organise for reliability during the more difficult months of the year. The points in this article are raised by one who has had many years of regular air line experience

NOT so very long ago I was chatting to an internal air line operator who, with good reason, was congratulating himself and his staff on the line's record for regularity. The show is quite an excellent one, but I could not refrain from pointing out the facts that his machines, though not specifically designed for such work, had done wonders, and that he had experienced none but the most perfect weather conditions. What, in fact, will happen when the visibility is next to nothing or when clouds are on the hilltops?

To say that an air line has only one genuine commodity, speed, is only stating a bare half-truth, for speed without regularity is obviously useless. However quickly a service may run on one day, cancellation for the following three days will not appeal to business men with appointments to keep, and these will revert soon enough to the slower and surer train.

The whole question depends on aircraft equipment, air route equipment, and ground organisation.

For the operation of absolutely regular services in winter and summer, and in every kind of weather except widespread fog, the needs are, roughly speaking, these:—

1. Multi-engined aircraft which the pilots know to be genuinely capable of maintaining height, when fully loaded, on a proportion of the available power. With such a machine a pilot will not hesitate to fly in or above the clouds.
2. One hundred per cent. efficiency in wireless communication between the machine and ground stations.
3. Meteorological information which must be available from expert—not amateur—sources at any moment.
4. Every facility in the way of assistance to navigation from ground stations.
5. Pilots trained to, and experienced in, blind flying, which is no longer a "stunt" to boast about, but a matter of mere routine.
6. Terminal airports equipped with every modern device to enable pilots to find it, and even to land on it.
7. Alternative airports, equally well equipped, outside the fog area of the terminal airport, where there must be such facilities for dealing with passengers so that they

reach their destination almost as soon as if they had disembarked at the normal terminus. In the case of Croydon, for instance, the alternatives are Gravesend or Gatwick.

By these means services need seldom be cancelled. Machines can be taken off when there is no visibility at all and land in the country of destination, even though the usual terminal port is impossible.

Now, all this is essential on cross-Channel services. Is it not also vitally necessary on internal routes? Competition from surface transport is usually keener within a country than on routes between different countries. How, then, do the small internal air line companies propose to compete with the railways when periods of bad weather come along? If the fleet is not properly equipped, and if the route, including the terminals, has no sort of organisation, if pilots are not trained to blind flying and dare not fly in or over the clouds a certain measure of regularity can be obtained in bad weather in only one way. Risks must be taken. High flying is safe flying, but low flying by landmarks is only safe in good weather.

Commercial flying cannot take place regularly on amateur lines, and a company setting out to sell travel to the public undertakes, by inference, to provide the fastest, safest, and most regular service. Pilots of a poorly equipped line will attempt to get through in dangerous conditions, and the whole service will then degenerate into an affair of personal skill and daring. If the last preponderates over the first, another air disaster claims the close attention of newspaper headline composers. In the early days of commercial flying facilities did not exist, and such flying had, of necessity, to be done. But there is no excuse to-day.

It has been argued that small companies cannot afford the luxury equipment of the big subsidised firms. The answer is simply that the proper equipment of machines, routes, and airports is a necessity.

Everybody has the greatest possible admiration for the pioneer, but he should not go forth to explore dangerous and unknown territory with a bow and arrow. He should start with the most up-to-date equipment available.

"RICHARD CARVETH."



ANOTHER "CRUISER" FOR BATAS: The Spartan, recently delivered at Zlin by Lt. Col. L. A. Strange, has three Walter-Junior-Major engines.

Commercial Aviation

CROYDON

Tarmac Control : The Real Public Arrives : Capt. Dismore's Coming of Age : Postal History Repeats Itself

WE are now asked to fill in a form and hand it to the Air Ministry whenever a test flight is made.

This is no mere red tape; for traffic is such to-day that a strict control of every machine is essential. But that is not the only reason; certain people are said to have combined test flights with joy riding, and there is no landing fee for the former!

Tarmac control is not only necessary in the air. Tarmac parking of machines about to depart must be regulated, for one badly placed aeroplane can upset several services. There is also the matter of aeroplanes, which are not wanted for the time being, left outside hangars, where they encroach on the space needed by departing or arriving aeroplanes; only a neutral control is capable of performing this work adequately, and it looks like being another job for the already hard-worked Control Tower people. Whilst on this subject one may as well mention the fact that when three or four machines, none carrying less than 14 passengers, are scheduled away at the same time, all the passports cannot be dealt with by one officer. On a recent evening the last aeroplane was ten minutes late for no other reason than passport examination.

There has been the usual Bank Holiday rush, and, as usual, all records have been broken. On Friday 550 passengers to and from the Continent passed through the Airport, to say nothing of large numbers of internal travellers. One who handles all passengers through the Airport tells me that the type of air traveller is changing, and that, though the aristocrat is still with us, we are also getting what is described as "the public orange eater." The answer for any public transport company should be "Let them all come—the more the merrier."

Early this week came Mr. and Mrs. Martin Johnson, after 18 months' exploration and film making in Africa. Their machines, two Sikorsky amphibians, painted, for obscure reasons, to resemble a giraffe and a zebra, were fitted with Pratt and Whitney "Wasp Juniors." Amongst the passengers was a large and amiable grey ape with long arms, which it twined affectionately round the neck of the stewardess on the tarmac. It also watched *Scylla* take off with the mild, yet critical, interest of a hardened air traveller.

Provincial Airways, Ltd., made a trip last week to the Angmering Court Country Club with a party of society people who arrived at Croydon in bathing kit, flew down, bathed and dined by the sea, and returned at about 9.30 p.m. A "Fox" and a "Dragon" were used. Olley Air Service, Ltd., had three parties for Goodwood during the week, and there was a passenger who flew in by K.L.M. from Holland to catch the Spartan Air Lines afternoon machine to the Isle of Wight. Lord Beaverbrook, with a party which included Viscount Castlerosse, required a "special" to Paris. The party was numerically small, and Imperial Airways offered the choice of a small machine or an "Argosy," each displayed on the tarmac. Lord Beaverbrook measured the machines with his eye and glanced at the Viscount. He decided on the "Argosy," despite the extra cost, and a spacious office arm-chair was installed therein.

On Sunday at 1.15 p.m. Major Anson's cricket team left Croydon for Holland. This is an annual event, and has become an annual K.L.M. booking. Major Anson is, incidentally, an enthusiastic air traveller who is purchasing a "Dragon" for family use.

Capt. F. Dismore, of Imperial Airways, Ltd., is to be congratulated on having completed 21 years of steady, unbroken flying. He was one of the pre-war Upavon people, where he was contemporary with Lord Trenchard. Capt. Dismore's flying career is thought to be a record, but there must be French and German pilots on the air routes who run him pretty close.

August 2nd was the 150th anniversary of the first mail coaches; before that mail was carried by post boys on horseback. People used to complain that letters posted some days before their departure by coach arrived at their destination some days after they themselves got there. Under public pressure the P.M.G. decided to use the novel—and therefore suspected—coach. History has repeated itself with the aeroplane, but it is pleasant to reflect that now the postal authorities are fully alive to the advantages of air transport at last. Possibly they were awaiting the mail coach anniversary before making up their minds about the aeroplane.

Passengers through the Airport last month, including internal travellers, numbered 12,500.

A. VIATOR.

HESTON

Birkett Pilot's 1,300-mile Day : The B.B.C. Pupil : Mass Travelling : The Month's Figures

SOME long-distance taxi work fell to the share of Mr. Val Meadway, of Birkett Air Service, last week. At 2.15 a.m. Birkett's received a telephone call asking for an aeroplane to take a client to Vienna immediately. Mr. Meadway got out a "Puss Moth," picked up the passenger at Croydon at 5 a.m., and at 8.30 they were having breakfast at Frankfurt. Arrived over Nuremburg, it was found that the passenger's passport was not in order, and they flew straight home to England, abandoning the object of the trip. At 4.30 p.m. Mr. Meadway, back at Heston, and having had no sleep the night before, took off again on a taxi flight to Manchester. His total mileage for the day was 1,300.

Stormy weather has made things less easy for Mr. Filson Young, of the B.B.C., who is learning to fly at Heston and broadcasting his experiences the while. Mr. Young is, nevertheless, making good progress, and by his sporting effort is bringing thousands of people into closer touch with an aspect of flying which they have little opportunity of studying at close quarters.

As we mentioned in the club news last week, Henlys Ltd., sole distributors for the Autogiro in England and Scotland, have sold a C.30 to the Bristol and Wessex Aeroplane Club,

and this is to be delivered towards the end of September. Airwork will shortly be equipped with one of these machines, and it will be interesting to see the use that the flying clubs and schools will be making of them in the course of a year or two.

"Parties catered for" is a slogan which the airline operator has borrowed from the busman. It is frequently illustrated at Heston, and was again last week when the British family Springlet occupied an entire "Dragon" on the Jersey crossing, and Carroll Gibbons and his Savoy Hotel Orpheans played themselves over to Deauville in two B.A.N.Co. Trimotor Fords.

During the month of July 4,268 take-offs or landings were registered by the control officer between 10.30 a.m. and lighting-up time. This is an increase of 8 per cent. on last month's figures. Airline passenger figures are also encouraging; they are as follows:—

	Passengers.	Increase.
B.A.N.Co.	551	170 per cent.
Portsmouth, Southsea and I.O.W.	704	146 per cent.
Jersey Airways, Ltd. ..	1,047	14 per cent.

The Australian Air Route

The date for the opening of the London-Australia service has been definitely fixed. Machines will leave Croydon on December 8, and Brisbane on December 5. The experimental service, of course, will be for mails only.

New Orkney Air Service

On August 6 Highland Airways, Ltd., opened a service between Kirkwall and the islands of Stronsay, Sanday, Westray, and North Ronaldsay. The new route will operate on Monday and Saturday each week.

COMMERCIAL AVIATION NEWS

Parcels to Ceylon

Commencing last Saturday, August 4, there began a weekly air parcel service to Ceylon by the England-India-Malaya air mail service. The parcels will be conveyed by air to Karachi, for transmission to Ceylon by surface transport, and will be due to reach Colombo 12 days after despatch. The inclusive postage rate is 3s. per half-pound up to a maximum of 20 lb.

Sikorsky Records

With six persons, including Col. Charles Lindbergh, aboard, the new Sikorsky for Pan-American Airways broke eight world's records last week. *Brazilian Clipper*, as the first Sikorsky is called, flew 1,242.8 miles with full load (37,300 lb.) at an average speed of 157.5 m.p.h. The records, incidentally, were broken with the four P. and W. "Hornets" at "cruising" throttle opening.

Another Atlantic Air Route Plan

It appears that Mr. George Hutchinson may leave New York on August 25 on the first of a series of four experimental Atlantic crossings, carrying a small payload. He is the president of the New York-London-Moscow Airline Corporation, which has been formed with the object of establishing a regular freight service from New York to Newfoundland, Galway, London, and Moscow.

Four machines, with special buoyancy devices in the case of forced landings, are being built at Glendale, California, and each will have a cruising speed of 200 m.p.h. and a range of 3,000 miles.

From Leeds to Paris

London, Scottish and Provincial Airways, in co-operation with Wallace Arnold Tours, Ltd., of Leeds, inaugurated a daily Leeds-Paris air service on Monday last, with Nottingham and Heston as intermediate calling points. Sherburn Aerodrome is the terminus for Leeds.

Wallace Arnold Tours hope to develop their motor-coach traffic to Scotland by means of the air service. The machines used are Airspeed "Couriers," and the return fare from Leeds for the Paris trip is £11 11s. In due course, "Envoys" will be put into service, but these are not yet ready.

That Atlantic Service

An official of Imperial Airways tells us that a fleet of twenty flying-boats has not been ordered for an Atlantic service. The facts are that, in accordance with their ordinary routine, they have issued invitations to the trade for designs for a new generation of aircraft to replace, in due course, the fleet now in use.

The suggestion that the aircraft are to be used for an Atlantic service is without foundation, but a misunderstanding may have arisen from the fact that the Government of Bermuda has recently passed an Act providing for the establishment of an air service between Bermuda and the mainland of North America by Imperial Airways.

Machines for the Glasgow Service

As a result of a misunderstanding, it was stated in last week's issue that Railway Air Services, Ltd., would use D.H.89's on the Belfast and Glasgow service. Actually D.H.86's (four "Gipsy VI" engines) will be used as soon as the service starts towards the end of this month.

A Question of Aerodrome Rights

A lawsuit which raised a point of aviation interest recently came before the Chancery Division of the High Court.

National Flying Services, Ltd., and Mr. C. J. G. Palmour, the receiver and manager of this company, were the plaintiffs, and they claimed an injunction to restrain Aircraft Exchange and Mart, Ltd., from using Hanworth aerodrome for flying instruction or for use of aeroplanes plying for hire. The plaintiffs contended that the agreement merely related to the hangar and conferred no rights over the aerodrome, other than normal flying access, on Aircraft Exchange and Mart, Ltd.

Mr. Justice Clauson, in giving judgment, observed that the plaintiffs were not objecting simply to the aerodrome being used as a means of access to the hangar. He saw, however, no clause in the agreement to prevent Aircraft Exchange and Mart, Ltd., from competing with the plaintiff company or to prevent them from using the hangar or the aeroplanes operating from it for instruction or for any other purpose.

He added that he could not appreciate how the use of the aerodrome could be limited in any way.

The action failed and was dismissed with costs.

A B.A.N.Co. Month

The machines of the British Air Navigation Co., Ltd., covered 34,435 miles, carried 558 passengers with their baggage, and, by affiliation with the other air lines, handled 1,260 passengers in all during the month of July.

The regular services to Deauville and Le Touquet have been well patronised, and the B.A.N.Co. have found it necessary to increase their fleet by the addition of another tri-motor 11-passenger Ford, powered by Wright "Whirlwinds." This machine will be called *Vagabond*. As with the rest of the fleet, *Vagabond* is equipped with two-way radio, which means that the pilot will be in constant communication with Croydon, Abbeville and Paris on the flight between Heston and Le Touquet, Dieppe and Deauville.

The past week's activities, in addition to the regular services, included the special charter of one of the Fords for Paris, and again for Stoke-on-Trent.

The B.A.N.Co. staff of pilots has been augmented by the addition of S. M. Ferguson, an Australian, who has, amongst other qualifications, some two thousand hours' experience flying mails and passengers in the U.S., including the unique and invaluable experience of taking air mails by night over the Alleghany mountains on the New York, Cleveland, Chicago air route—a hazardous business in winter.

AIR MAIL ADVISORS

Sir Murray Sueter, Sir Frederick Sykes, and Group Captain Primrose Appointed

THE Postmaster-General has appointed Rear-Admiral Sir Murray Sueter, C.B., M.P., and Major General The Right Honourable Sir Frederick Sykes, G.C.I.E., G.B.E., K.C.B., C.M.G., to the Post Office Advisory Council to act as members of the Air Mail Panel of the Council. Group Captain W. H. Primrose, D.F.C., Royal Air Force (retd.), has also been appointed Air Mail Advisor to the Post Office.

Sir Murray Sueter, who is Chairman of the Parliamentary Air Committee, has been connected with aviation from the earliest days and was responsible for the creation of the Royal Naval Air Service. Amongst other appointments he has held those of Director of the Air Department at the Admiralty between 1911 and 1915, and Superintendent of Aircraft Construction from 1915 to 1917, and was in command of the R.N.A.S. units in Southern Italy in 1917 and 1918. He was a member of the Advisory Committee on Aeronautics from 1908 to 1917, and has been M.P. for the Hertford Division since 1921.

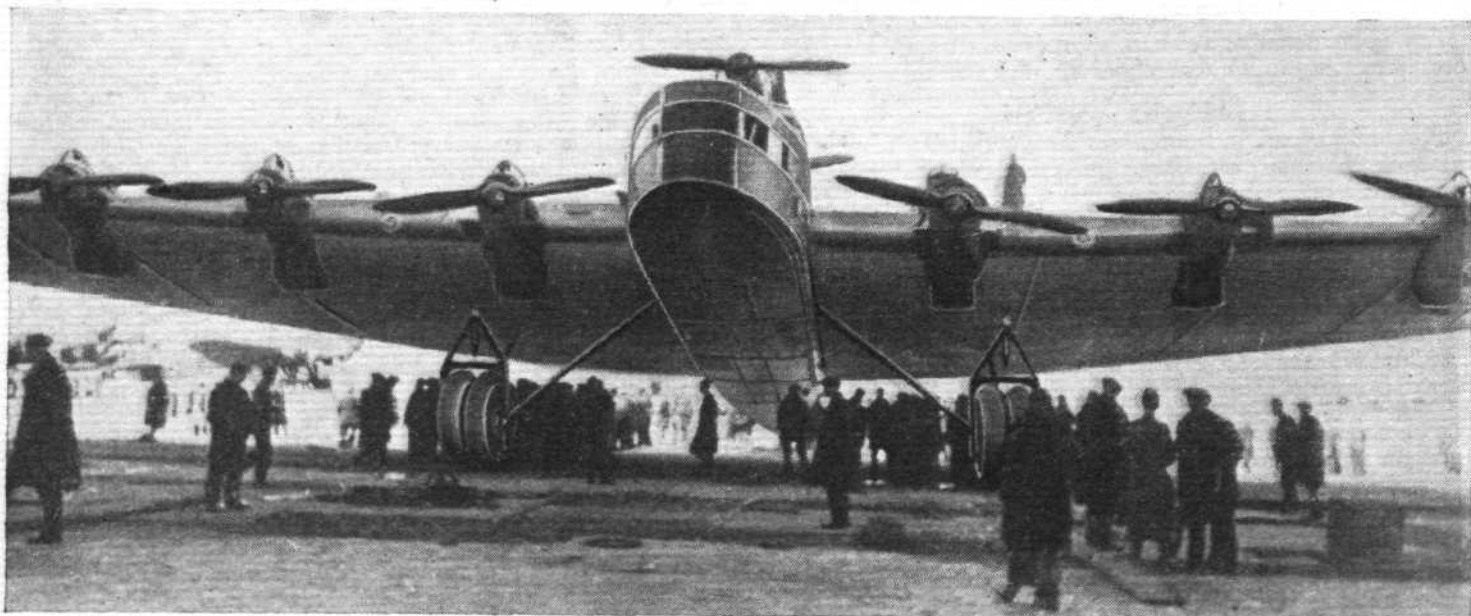
Sir Frederick Sykes raised the Royal Flying Corps Military Wing in 1912 and commanded it until 1914. He commanded the R.A.C. in France in 1914 and 1915, and the R.N.A.S. in the Eastern Mediterranean in 1915 and 1916. He was Chief of the Air Staff in 1918 and 1919, and in that capacity attended the Peace Conference in Paris as Chief of the British Air Section. Sir Frederick was Comptroller General of Civil Aviation from 1919 to 1922, and M.P. for the Hallam Division of Sheffield from 1922 until 1928, when he was made Governor of Bombay, which post he relinquished last year.

Group Captain Primrose, on the outbreak of War, went to France as a Captain in the 7th Battalion of the Argyll and Sutherland Highlanders. In 1915 he transferred to the Royal Flying Corps, in which he served in Egypt and Palestine and was awarded the Distinguished Flying Cross. In 1918, in connection with the Peace Conference, he was appointed by Sir Frederick Sykes to form and command a Communication Wing, which was the first passenger and mail service between London and Paris. He retired from the R.A.F. in 1932.

Commercial Aviation

THE "MAXIM GORKY"

*Some Details of the All-metal Monoplane Built in Soviet Russia for Propaganda Purposes:
With a Seven Ton Payload the "Maxim Gorky" Cruises at 137 m.p.h.*



ALL the experience of the Central Aero-Hydrodynamic Institute of the U.S.S.R. has been incorporated in the giant aeroplane, *Maxim Gorky*, which has been primarily designed by Mr. A. N. Tupolov.

Built principally for agitation purposes, the machine will officially become the flagship of the Maxim Gorki Propaganda Squadron on August 18—Soviet Aviation Day. Until that date it will continue to undergo further tests at the Moscow Central Aerodrome.

The *Maxim Gorky* is an all-metal monoplane with a span of 210 feet and with eight Soviet engines—two in a nacelle above the fuselage—developing a total of 7,000 h.p., and has maximum and cruising speeds of 149 and 137 m.p.h. respectively. The maximum fuel capacity is sufficient for a cruising range of 1,240 miles, and the machine can make 600-mile non-stop flights in the normal course of events. It will carry a crew of 23, and there is accommodation for 40 passengers—the maximum payload, incidentally, is given as 7 tons.

The under surface of the wing is on the same level with the floor of the fuselage, so that there is comfortable access from the wing cabins to the fuselage. Entrance is made by a door on the left side of the fuselage and by a trapdoor on the underside. The passenger cabins are well above six feet in height, and contain four bunks each. A highly satisfactory ventilating and steam heating system has been worked out; controlled ventilation is effected by admitting air through a vent in the nose of the fuselage and transmitting it by ducts to the cockpit, cabins and other compartments in the wing and fuselage. A thermostat ensures that the temperature in

the cabins will be maintained at 70 degrees Fahr., even with outside temperature as low as 20 degrees below zero.

The arrangement of the compartments in the fuselage, starting from the forward end, is as follows: the saloon, pilot's cockpit, a passenger cabin, the radio transmitting room, editorial offices, passenger compartment and café, buffet, another passenger compartment, cinema room, microphone room and radio receiving room, followed by other passenger cabins, luggage compartments and lavatory. Two petrol engines drive generators for direct and alternating current, and air compressors for compressed air. An alternating current of 120 volts has been applied, it is believed, for the first time in this machine. A searchlight of 2.8 million candlepower, attached to the underside of the nose, will light up a wide area from an altitude of 3,000 feet.

A special room has been set aside for the "editorial offices," and a rotary press, as well as a photographic laboratory, has been installed, the latter being in the wing. Three operators take care of the radio apparatus, both receiving and transmitting, and one will always be on duty in the transmitting cabin. A powerful loud speaker is attached to the under side of the fuselage, and lectures, music and news bulletins will be voiced from 3,000 feet.

In the roomy cockpit there is a robot pilot, and direction finding apparatus, as well as the usual blind flying instruments.

The idea for this propaganda machine was first advanced by Michael Koltsov, a well-known Soviet journalist, and workers, peasants, students, Red Army men, and newspaper men, subscribed some six million roubles to build it.

The "Graf Zeppelin"

When the *Graf Zeppelin* completed her third out-and-home trip of the season between Germany and South America on July 3 she had flown a total of 500,000 miles—a distance equal to a return journey from the earth to the moon! The veteran airship is still piling up mileage, eleven return trips being scheduled for this—her fourth—year's regular South American service, of which four have already been completed.

The time table for this season's *Graf Zeppelin* trips was as follows:—Departures from Friedrichshafen (Saturday evening) July 21, August 4 and 18, September 1, 15 and 29, October 13 and 27. She arrives at Pernambuco on the following Tuesdays and at Rio de Janeiro the following Thursdays. Returning, she leaves Rio on Thursdays (next day from Pernambuco) as follows:—July 26, August 9 and 23, September 6 and 20, October 4 and 18, and November 1, arriving at Friedrichshafen on Tuesday afternoon. Bookings can be arranged through the Hamburg-American Line, Wm. H. Müller & Co., 66-68, Haymarket, S.W.1.

Defeating Fog

If reports from New York are to be believed, fog dissipation, by chemical means, is an accomplished fact. Scientists of the Massachusetts Institute of Technology have, after several years of study, staged an experiment at a private aerodrome and succeeded in clearing fog after three minutes. The chemical employed possesses the power to collect water vapour in large masses and precipitate it as rain.

Air Mails Increase

During the quarter ended on June 30, 61,300 lb. of letter air mails were carried from this country, as compared with 43,000 lb. in the corresponding quarter of 1933—an increase of 42 per cent. The carryings to India alone were 13,959 lb., as compared with 10,770 lb. It is estimated that nearly 400,000 more letters were sent by air from this country during the June quarter of 1934 than during the corresponding quarter of 1933.

FLYING THE AUTOGIRO

What It Entails:

Its Special Technique:

Its Scope and Its Advantages

By C. N. COLSON



THIRTY-ONE years have elapsed since the Wright brothers made their first memorable flight. Looking back over the types of aeroplanes which have been built and flown since that time, I have often wondered when we should hail a design which could be justifiably regarded as an entirely new and revolutionary addition to the science of aeronautics. Compare our latest types of what, for want of a better description, we may call normal aeroplanes, and it must be admitted that these bear a strong resemblance to the Wright Brothers' machine. The differences are all the result of slow rational development along well-tried lines, just steady improvement, with nothing spectacular, so that we now have aeroplanes which will accomplish far more than those early designers can ever have visualised. And yet, to the general eye at any rate, there is no striking departure in outward appearance.

The Autogiro provides an exception, and in it we have a flying machine which really is revolutionary in all senses of the term. It is only natural, therefore, that flying it should necessitate learning a new technique, but not the least revolutionary thing about it is that the technique is far easier to acquire than that necessary to fly a normal aeroplane safely.

I have had the pleasure of flying most types of Autogiro which have been produced during the past few years, as well as most of the ordinary civil aircraft, and, comparing their various attributes, not one of them has imbued me with a greater sense of satisfaction than the latest C.30 Autogiro. Its control is perfectly straightforward and, when once understood, simple and safe. There are two main and two auxiliary controls for flying purposes and four others used on the ground. It seems a lot when set out thus baldly, but after all, every average person learns to cope with a motor car, and to do so they have to learn the use of at least eight controls and very often four or five more, apart from all the switches for lamps, ignition, etc.

Flight has constantly pointed out that, in general, there is very little analogy between flying and motoring, but that there is some between flying and shipping. This is

perfectly correct in so far as most civil aeroplanes are concerned, but taking the Autogiro in particular there does seem to be some common ground on which to compare it to a motor car. The controls of the two bear a distinct resemblance to each other, a fact which will assist materially to make it the machine the "man-in-the-street" will want to fly as soon as cheap models are available.

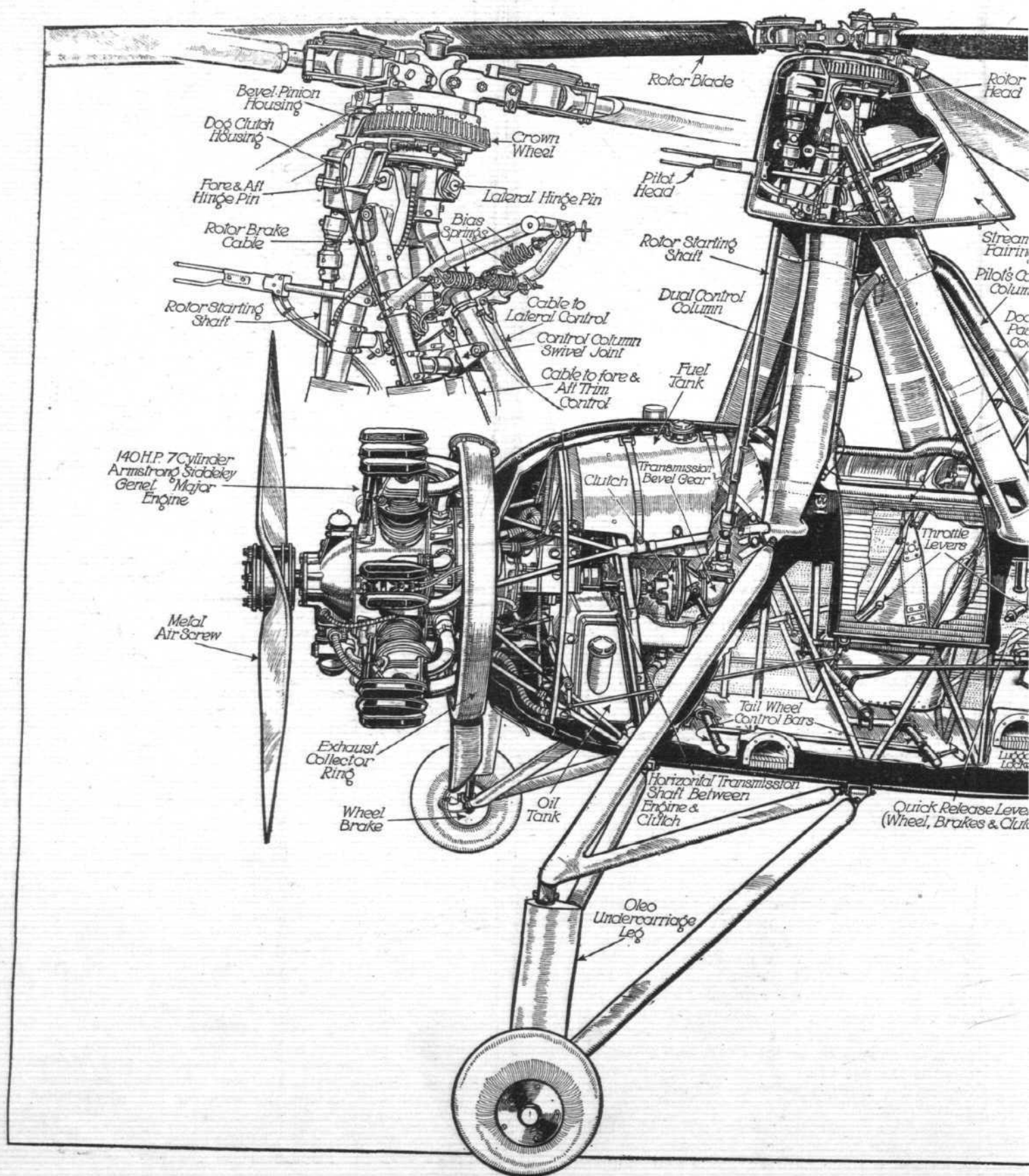
Taxying out on to the aerodrome does not necessitate the use of anything except the throttle control, the steerable tail wheel and eventually the wheel brakes. The tail wheel is operated from a bar in the same manner as the rudder in a normal aeroplane, that is to say, when the right foot is pushed forward the tail wheel moves to the right and the Autogiro follows.

Starting up, once the simple sequence of events has been acquired, is, if anything, rather less difficult than starting up a car and getting away smoothly from a stationary position up a steep hill. On the pilot's left there is a wheel brake lever for the landing wheels, acting on a normal ratchet, and after the machine has been turned into the wind this is locked hard on. Outside this lever there is another lever working in a gate rather like a motor car gear lever. Out and up puts a brake on the rotor head which carries the three lifting blades, in and up engages the rotor clutch. So having taxied out, turned into wind and put on the wheel brakes, the rotor brake is released, the lever shifted inwards in its gate and, with the engine turning over at 1,000 r.p.m., the clutch is slowly engaged, locked right home on its ratchet and the control column or "stick" by means of which the rotating blades are controlled is unlocked. The rotor is then speeded up to about 180 r.p.m. by opening the throttle slowly. At this point a movement forward of the left hand flicks off a quick release, freeing both the wheel brakes and the rotor clutch together, and an immediate slight further movement opens the throttle wide. Keeping the machine straight with the tail wheel by counteracting a slight tendency to swing to the left due to the torque reaction of the rotor blades, the "stick" is eased back and the machine is in the air. It sounds simple

A GRAPHIC ILLUSTRATION

Showing the Contr

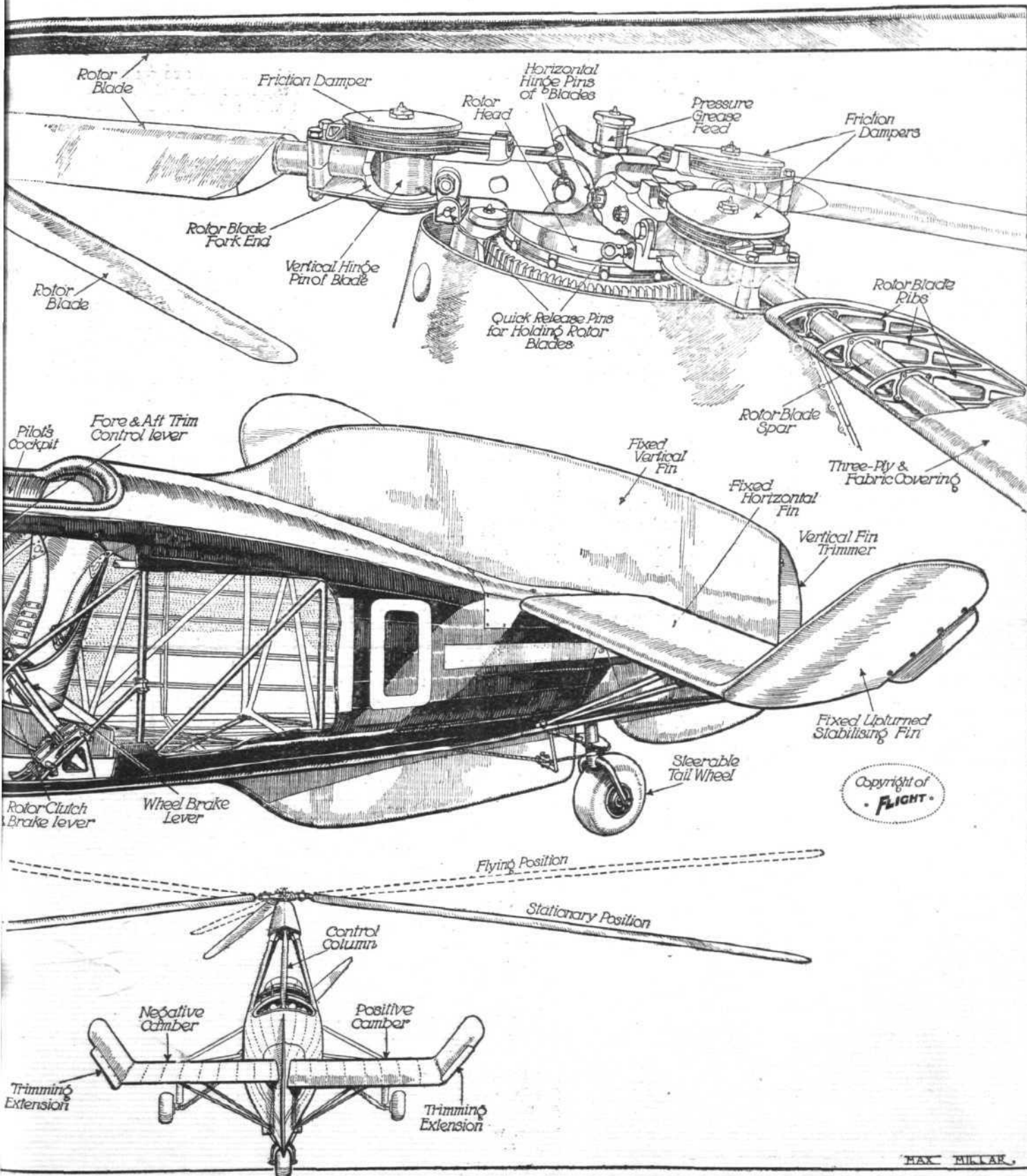
This special drawing prepared in conjunction with the article and the companion article



OF THE C.30 AUTOGIRO

Constructional Details

by *Flight*, should be studied in "Winged Flight," in the last issue, entitled "Flying the Autogiro."



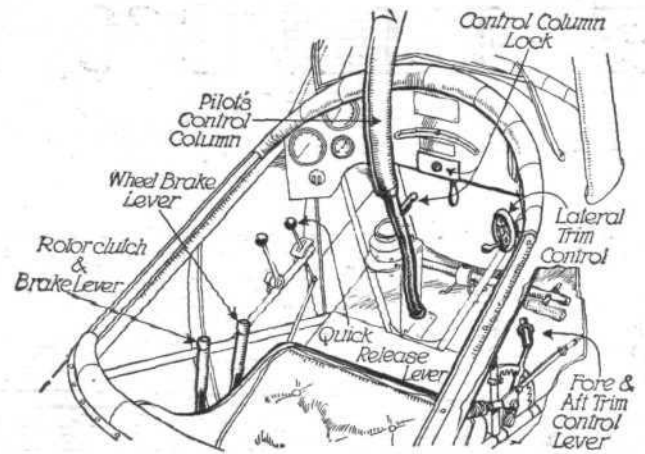
and so it is, though there are naturally other small matters of technique which need to be studied in actual practice.

In the air I am always imbued with a sense of peace and security when in an Autogiro. I know that no inadvertence on my part will result in a spin or a lurid skidding turn; I know also that if the engine stops doing its job and packs up I shall have no difficulty in finding a piece of ground large enough to sit down on. Anyone thoroughly accustomed to flying normal aeroplanes does not, of course, worry about these things unduly. Engines seldom fail nowadays and flying sense makes one avoid lapses quite subconsciously; but in an Autogiro that subconscious sense reasserts itself and one consciously thinks "By jove this is fine; now, within reason I needn't worry what I do." Handling in the air is so simple that I found it, at first, difficult to realise that there was no snag in it. Put the "stick" to the left and the machine goes to the left, to the right and it goes to the right, in each case taking up the proper angle of bank to prevent skidding on the turn, so all there is to do is to keep the nose on the horizon by pushing the "stick" forward or holding it back. It is in turning that the Autogiro has a great advantage over the normal aeroplane. In the latter, the steeper the turn, the greater the tendency to loose flying speed. To prevent this the throttle has to be opened; but an Autogiro is not dependent upon the speed of the whole machine through the air for its lift—the more or less constant rotor blade speed looks after that—so a quick turn can, if desired, be made easier by closing the throttle a little, thus decreasing the centrifugal force to be contended with on the "stick." That feature is a natural safeguard, because the "stick" becomes progressively heavier to move the greater the amount of control used—not the faster the machine is going—therefore quite instinctively the pilot does not overdo things, although it would be almost impossible to get into any danger if he did.

Flying at 15 m.p.h.

Perhaps the most satisfying thing about this machine in the air is its ability to fly very slowly. A minimum speed in level flight of 15 m.p.h. is available, so against any normal wind it is obvious that the ground speed can be brought down to almost nothing, and if one is content to lose height, then the minimum speed is 0 m.p.h. The most important thing about that, to my mind, is the safety factor it provides when flying in bad weather. Crashing through low clouds or ground fog at anything above 50 m.p.h., as has to be done in most aeroplanes, is not a game for the sane, but in an autogiro if the weather gets thick it is easy to go slowly and look around carefully, so slowly that there is plenty of time to avoid obstructions if they can be seen at all, and if they can't, then there is that blessed feeling of relief in the knowledge that it is possible to land almost vertically at no m.p.h., and therefore there is little risk of not getting the machine down "in one piece."

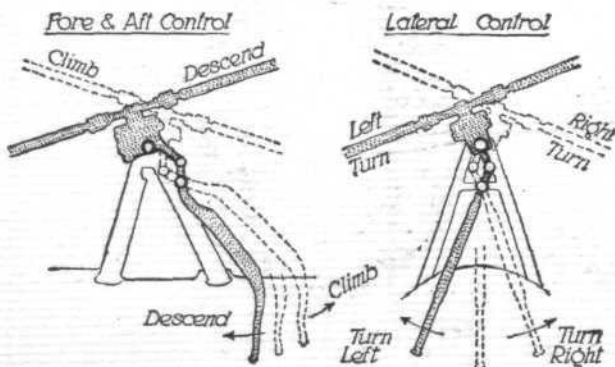
Landing calls for little more in the way of technique than does taking off. The approach can be made in the normal



IN THE COCKPIT: The flying controls are confined to a single "hanging" stick, the foot bar being used for operating the tail wheel when the machine is taxiing.

manner; glide in at about 35 or 40 m.p.h., flatten out and, quite literally, sit down or come over the point where you want to perch, ease the "stick" back so that the machine is sinking vertically and, if there is any wind, possibly drifting backwards slowly, keep your eye on the objective. Ease the "stick" forward and pick up a little forward speed to get farther ahead (or if the sinking speed is too fast) and so place yourself that after flattening out at about 5 to 3 feet up, you sink on to the ground just where you wanted to be, with just sufficient forward speed to prevent drifting backwards. The Autogiro can, if necessary, be landed right off its vertical descent without "bending" anything, but the practice is not recommended as it is asking a quite unnecessary amount from the long-suffering undercarriage. The penultimate stage of an almost vertical approach should always be a short glide followed by a "crow-like" perch from a few feet up. On touching the ground, shove the "stick" forward at once so as to lose all lift, due to the forward tilt of the rotor, lock it in that position and then turn left out of wind. With the blades idling round, it is safe to taxi, but the best position, particularly when a strong wind is blowing, is with the brake on and the rotor stopped, with one blade in front just to the right of the nose. In a strong wind it is also necessary to put the wheel brakes on immediately after landing, or else open the throttle slightly to prevent running backwards. In this condition it is necessary to land with some forward speed, of course, either by gliding or by the use of the engine, a point which people used to normal aircraft with their 40-50 or more m.p.h. landing speed are apt to forget. There is one point about the approach which is worth noting and that is that the rate of descent relative to the ground speed varies with every different wind speed and, therefore, the rate cannot be judged from the angle of the machine to the horizon, as is done with normal aeroplanes. With the autogiro, it is the best practice to judge the glide—or sink—from some object on the ground near which it is intended to sit down.

I find it difficult to temper my enthusiasm for the Autogiro. There is so much in favour of it that I am tempted to overlook the few points which are open to criticism. Of those concerned with the flying of the machine, the only one which is of real importance is the view from the rear cockpit. A normal landing with this machine means sinking to the ground at a steep angle for the greater part of the approach. The fuselage then gets in the way rather seriously, which necessitates yawing from side to side during the approach. I am not at all certain why the normal fuselage design has been followed so closely. The general features of the Autogiro seem to call for a pusher arrangement, with pilot and passenger side by side. But perhaps that is a development which Señor de la Cierva has in mind for his next type.



DIRECT CONTROL: The way in which the rotor head is tilted should be clear from these diagrammatic views.

FOREIGN AIRCRAFT

AN AMERICAN "SPORT" MONOPLANE

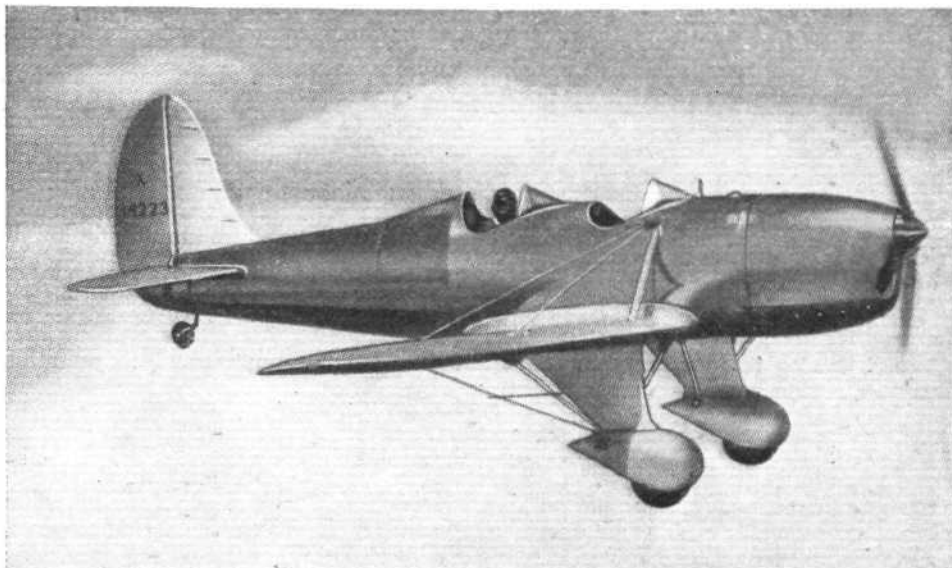
The Ryan S-T With Menasco B.4 or C.4 Engine

A COMPLETELY new type of two-seater "Sport" monoplane has recently made its first test flights and has been approved by the American Department of Commerce. The machine is known as the Ryan S-T, and for a comparatively low-powered type has an excellent performance.

The fuselage is a metal monocoque structure of 17 S.T. aluminium alloy and 17 S.T. alclad skin. A luggage compartment is situated between the two tandem cockpits. If desired a sliding type enclosure for the cockpits may be supplied.

Solid spruce spars are used for the wings, which are of high aspect ratio and braced with streamlined tie rods. All other structural parts are of metal. The ribs are stamped from aluminium alloy 17 S.T. sheet, and the covering of the wing from the leading edge to the rear of the front spar is also of this material. The rest of the wing and the control surfaces are covered with fabric. The ailerons are of the modified Frise type and are differentially operated. Flaps extend over half the wing span and are operated by a small crank. It has been proved that these flaps decrease the landing speed by 8 m.p.h. and permit a steep angle of approach.

The stub wings are of tubular steel construction, and are removable.



95 H.P.—145 M.P.H. The Ryan S-T two-seater with Menasco B.4 engine of 95 h.p.

Steel tube is employed for the engine mounting, which is supported on rubber mountings at the fuselage. The engine is also carried on large rubber mountings on the bearers, with resultant damping of vibration at all speeds.

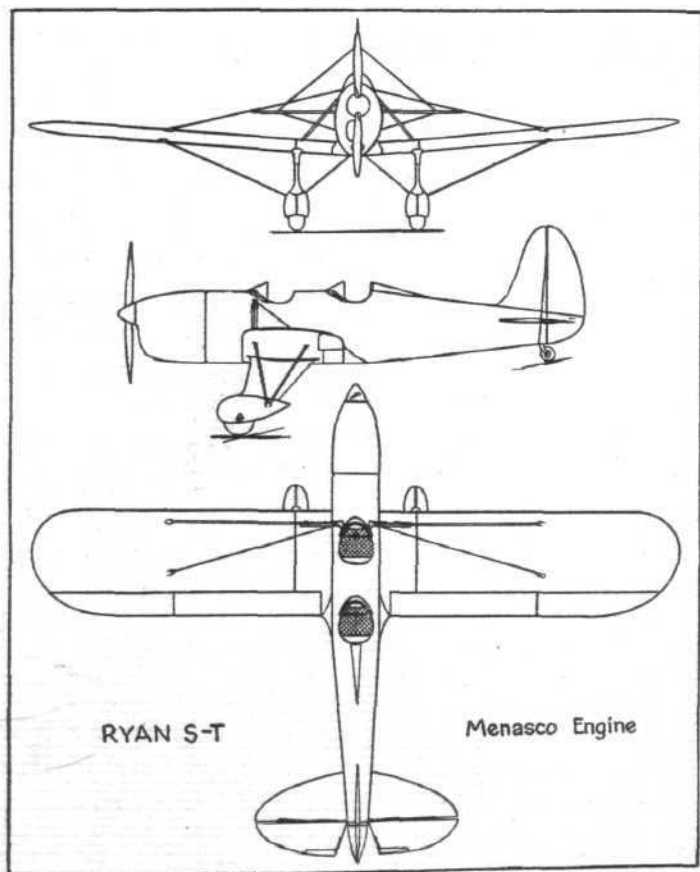
The neat undercarriage may be seen in the accompanying general arrangement drawings, for which we are indebted to *Aero Digest*. It is of racing type, incorporating long-throw vertical oleo shock-absorbers and full Goodyear air wheels and brakes. Landing stresses are distributed to the fuselage by a pair of inclined struts between the wing panels and the body.

Arrangements, it may be noted, have been made for the Goodyear air wheels to be completely removed without disturbing the fairings which enclose them. An 8 in. pneumatic tyre of the full swivelling type is fitted beneath the tail.

As in most of these American low wing monoplanes "tabs" are provided on the trailing edges of the elevators for trimming. Dual controls are fitted, those in the front cockpit being quickly removable.

Either the 95 h.p. Menasco B.4 or 125 h.p. Menasco C.4 in-line air-cooled inverted engines may be used. It is claimed that with the Menasco B.4 fuel consumption is about 20 m.p.g.

It is expected that an improved airscrew will increase the top speed figure of the machine given in the accompanying table.



RYAN S-T
Menasco B.4 95 h.p. engine.

DIMENSIONS			
Span	...	...	30ft. (9.14 m)
Length	...	...	21ft. 5in. (6.6 m)
Wing area	...	...	124ft. (11.5 m ²)
Height	...	...	6ft. 11in. (2.1 m)
WEIGHTS			
Weight empty	...	...	1,022 lb. (464.5 kg)
Gross weight	...	...	1,550 lb. (703 kg)
PERFORMANCE			
Top speed	...	...	142 m.p.h. (228.5 km/hr)
Cruising speed	...	...	122 m.p.h. (196 km/hr)
Service ceiling	...	...	16,500ft. (5 029 m)
Absolute ceiling	...	...	17,650ft. (5 380 m)
Landing speed	...	...	38 m.p.h. (61 km/hr)
Cruising range	...	...	403 miles (649 km)

INSURANCE AND THE MELBOURNE RACE

There appears to be a feeling in some circles that it is impossible to obtain insurance cover for the pilots and machines taking part in the England-Australia air race. We are informed that this is a mistaken idea. There is in existence a

central insurance pool scheme which is already negotiating with entrants in the race. Furthermore, we are informed that there is at least one firm of Lloyd's brokers who are prepared to quote rates at the present time.

THE ROYAL AIR FORCE

Service Notes and News



Air Ministry Announcements

NOMENCLATURE OF AIRCRAFT—"HIND"

The official name of the Hawker day bomber aeroplane fitted with "Kestrel V" engine is "Hind."

RE-EQUIPMENT OF UNITS

The following re-equipment of Units has recently taken place:—

UNIT.	DETAILS.
No. 24 Squadron ..	Osprey replaced I.I.F. G.P.
No. 801 Squadron ..	Osprey replaced Flycatcher
No. 810 Squadron ..	Baffin replaced Dart
No. 403 Flight ..	Osprey replaced Flycatcher
No. 406 Flight ..	Osprey replaced Flycatcher
No. 820 Squadron ..	Seal replaced I.I.F. F.A.A.

The following Units are expected to complete or commence re-equipment during the next few months:—

No. 8 Squadron ..	Vincent to replace I.I.F. G.P.
No. 30 Squadron ..	Hardy to replace Wapiti
No. 41 Squadron ..	Demon to replace Bulldog
No. 84 Squadron ..	Vincent to replace Wapiti
No. 19 Squadron ..	Gauntlet to replace Bulldog
No. 10 Squadron ..	Heyford to replace Virginia
No. 205 Squadron ..	Singapore to replace Southampton
No. 824 Squadron ..	Seal to replace I.I.F. F.A.A.

NIGHT FLYING WITHOUT NAVIGATION LIGHTS

Night flying exercises without navigation lights will be carried out by R.A.F. aircraft within the area bounded by straight lines joining Chelsfield-Addington-Oxted-Sevenoaks-Chelsfield, from July 29 to December 31, 1934. For three hours from half-hour after sunset daily (Saturdays and Sundays excepted). Aircraft will not exhibit navigation lights whilst flying above 3,000 feet unless other aircraft are observed in the vicinity.

AIR FORCE LIST

The August issue of the Air Force List has now been published. It can be purchased (price 2s. 6d.) from H.M. Stationery Office at the following addresses:—Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh; 2, York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square, Belfast; or through any bookseller.

EXPANDING THE R.A.F.

The Air Ministry has issued details of the scheme for providing the officers and men required for the new squadrons which are to be formed. The following are the most important points of the order published:

It is notified for information that the following are the special measures which will be taken to meet increased requirements of personnel consequent upon the decision of H.M. Government to expand the Air Force.

(1) Increased entry of short service officers and airman pilots: An increase will be made in the entry of short service officers, and additional airmen will be selected for training as airman pilots. No. 2 F.T.S. Digby will reopen in October.

(2) Increased entry into medium service: The entry into medium service will be increased and additional appointments to medium service are being offered by letter to short service officers whose names were included in the recommendations forwarded on September 1 last.

(3) Increase in the establishment of permanent officers: A strictly limited increase will gradually be effected in the strength of officers of the General Duties branch holding permanent commissions. The limits of this increase will be fixed by the capacity of the Service to provide a satisfactory career for officers entered on permanent commissions.

(4) Increased intake of apprentices into Halton and Cranwell: Increases will be made in the number of boys entered as aircraft apprentices. The number of boys entered as aircraft apprentices in August at No. 1 School of Technical Training, Halton, is being increased by 100.

(5) Extensions of service of non-apprentice tradesmen.—(a) Fitters and riggers: Airmen of these trades serving on engagements for less than nine years' Regular service will be considered for extension to that period, provided that their service is in all respects satisfactory; (b) Wireless operators and armourers: Airmen of these trades due for discharge before April 1, 1936, will be considered for an extension of service up to a total of 10 years' Regular service provided that their service is in all respects satisfactory.

(6) Extension of service to 14 years' Regular service of ex-apprentice tradesmen: Ex-apprentice airmen in Group 1 trades who are due for discharge on completion of 12 years' service before April 1, 1936, will be considered for extension of service to 14 years' Regular service, followed by four years' Reserve service on the same general conditions as laid down in Air Ministry Order for ex-apprentice tradesmen who enlist for four years' Reserve service. On transfer to the Reserve, however, on completion of the additional two years' Regular service, they will receive a gratuity of £175 in lieu of the special gratuity of £100 provided for in that Order.

(7) Employment of ex-airmen in fitter and rigger vacancies: An anticipated temporary shortage of fitters and riggers in home units before the measures explained above are fully operative will be made good by the appointment of ex-airmen in a civilian capacity.

PROMOTION TO FLIGHT LIEUTENANT.

The Air Council have decided to introduce as from August 1, 1934, the system of time promotion to flight lieutenant in the general duties, stores and accountant branches.

The scheme outlined below will apply to all officers holding permanent commissions in the general duties, stores and accountant branches, other than officers commissioned from warrant rank. It will also apply to officers holding short service commissions in the general duties branch if they have been selected for permanent commissions or medium service. It will not apply to officers on the Supplementary List or to officers holding temporary commissions whilst seconded or attached to the Air Force from the Navy or Army.

On and after August 1, 1934, a flying officer may be promoted to flight lieutenant at the discretion of the Air Council on attaining, in the general duties branch, four years' seniority as flying officer and, in the stores and accountant branches, six years' seniority, provided that he has been certified by his air or other officer commanding as suitable for promotion and that, in the general duties and stores branches, he has qualified by examination for promotion. The promotion of an officer who on attaining the prescribed seniority cannot be certified as fit for promotion will be deferred until he is so certified. The promotion of an officer of the general duties or stores branch who on attaining the prescribed seniority has not passed the qualifying examination for promotion will be deferred until the date of the Air Ministry Order announcing the results of an examination at which he has qualified.

On becoming qualified for promotion as laid down in the preceding paragraph an officer's case will be examined and promotion will not be approved unless the Air Council judge that he is in all respects suitable to hold the higher rank. If an officer on attaining five years' seniority in the general duties branch, or seven years' seniority in the stores or accountant branch, is still not qualified or not judged suitable for promotion, he will be retired on grounds of unsuitability unless the Air Council decide that in the special circumstances of the case retention for a further period is in the interests of the Service.

As soon as an officer becomes otherwise qualified for promotion under the terms of para. 3 above, his commanding officer will forward through the usual channels a certificate stating whether or not his service has been in all respects satisfactory and he is suitable to perform the duties of the higher rank. If this certificate is to the effect that the officer is not suitable for promotion, a report will be appended stating the reasons.

While the responsibility for initiating certificates regarding promotion rests on the commanding officer of the unit on whose strength the officer reported on is borne at the date of becoming eligible for promotion, air or other officers commanding will exercise discretion whether a further certificate regarding promotion should

not be obtained from a previous commanding officer where the officer reported on has been an insufficient time with his unit for a reliable opinion to be expressed by the commanding officer as to his suitability.

Flying officers who on August 1, 1934, are qualified under the

terms of para. 3 above will be considered by the Air Ministry for promotion with effect from that date and no action is required by commanding officers under para. 5 above in respect to them. Action is required under that paragraph as regards all officers who become qualified for promotion after August 1, 1934.

ROYAL AIR FORCE GAZETTE

London Gazette, July 31, 1934

General Duties Branch

The follg. Pilot Officers on probation are confirmed in rank:—
S. J. McN. Newman (June 6); T. B. Morton (June 24).

The follg. promotions are made with effect from Aug. 1:—

FLIGHT LTS. TO BE SQUADRON LDERS.—O. E. Carter, A.F.C.; S. E. Storarr; H. S. Broughall, M.C., D.F.C.; S. D. Macdonald, D.F.C.

The follg. Pilot Officers are promoted to the rank of Flying Officer:—D. S. Kite, R. J. Knights-Whittome, D. A. Pemberton, A. G. Powell (June 17); R. S. Howe (June 18).

The follg. Flying Officers are transferred to the Reserve, Class A:—
G. E. B. Stoney (July 14); G. G. Stead (July 15).

The notification in the *Gazette* of June 5 concerning Flying Officer C. M. Rees is cancelled. Lieut. W. G. Williams, R.N., Flying Officer, R.A.F., is cashiered by sentence of General Court-Martial (July 6).

Stores Branch

The follg. Warrant Officers are granted permanent commissions as Flying Officers on probation with effect from and with seny. of July 20:—H. Wood, M.B.E.; W. G. R. Jarman, H. E. Bethell, E. J. Bradbury, T. J. Kinna.

Chaplains Branch

R. Rees is granted a short service commission with the relative rank of Squadron Ldr. with effect from and with seny. of July 18.

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

W. Hill is granted a commission as Pilot Officer on probation in Class AA(i) (July 9); Flt. Lt. A. J. G. Anderson is granted the hon. rank of Sqd. Ldr. (July 24); Flt. Lt. A. D. Bennett is trans-

ferred from Class A to Class C (June 24, 1933) (substituted for the notification in the *Gazette* of July 17); F/O. H. E. Sales is transferred from Class A to Class C (Jan. 31); F/O. G. E. Gould is transferred from Class AA(ii) to Class C (April 3); F/O. T. B. Fenwick is transferred from Class C to Class A (July 4); P/O. C. Bland relinquishes his commission on completion of service (July 18); F/O. T. C. Wallace relinquishes his commission on account of ill-health (Aug. 1).

Stores Branch

Flt. Lt. E. P. Hardman, D.F.C., is transferred from Class B to Class C (July 31).

Special Reserve

General Duties Branch

R. M. Broadhead is granted a commission as Pilot Officer on probation (July 18).

AUXILIARY AIR FORCE RESERVE OF OFFICERS

General Duties Branch

W. H. Wetton is granted a commission as Flying Officer in Class A (April 8).

TERRITORIAL ARMY

Anti-Aircraft Searchlight Battalions

26TH (LOND.) A.A.S. BN. (L.E.E.).—Capt. (Qr.-Mr.) W. J. P. Harlin having attained the age limit retires and retains his rank, with permission to wear the prescribed uniform (Aug. 1).

August 4, 1934

26TH (LOND.) A.A.S. BN. (L.E.E.).—F. J. Pope to be Lt. (Qr.-Mr.), (Aug. 2).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commander.—G. C. Bailey, D.S.O., to Air Armament School, Eastchurch, 24.7.34. For Administrative duties vice W/Cdr. W. Sowrey, D.F.C., A.F.C.

Flight Lieutenants.—L. Martin, to Marine Aircraft Experimental Establishment, Felixstowe, 22.7.34. E. L. S. Ward, to School of Army Co-operation, Old Sarum, 16.7.34. E. P. M. Davis, A.F.C., A.M., to D.O.I., Dept. of Chief of the Air Staff, Air Ministry, 24.7.34. G. Francis, to Headquarters, Coastal Area, Lee-on-the-Solent, 18.7.34. G. E. Sampson, to School of Naval Co-operation, Lee-on-the-Solent, 23.7.34.

Flying Officers.—R. J. R. H. Makgill, to No. 2 Aircraft Storage Unit, Cardington, 21.7.34. G. A. Bolland, to Station Flight, Andover, 24.7.34. T. H. L. Nicholls, to Administrative Wing, Halton, 24.7.34.

Pilot Officer.—M. Hastings, to No. 8 (B) Squadron, Aden, 1.7.34.

Stores Branch

Flight Lieutenant.—C. P. Wingfield, to Station Headquarters, Manston, 24.7.34.

Flying Officers.—J. S. French, to Administrative Wing, Halton, 23.7.34. W. G. S. Wood, to Administrative Wing, Cranwell, 21.7.34. G. Matthews, to No. 2 (A.C.) Squadron, Manston, 24.7.34. J. E. Reynolds, to Station Headquarters, North Weald, 24.7.34.

Medical Branch

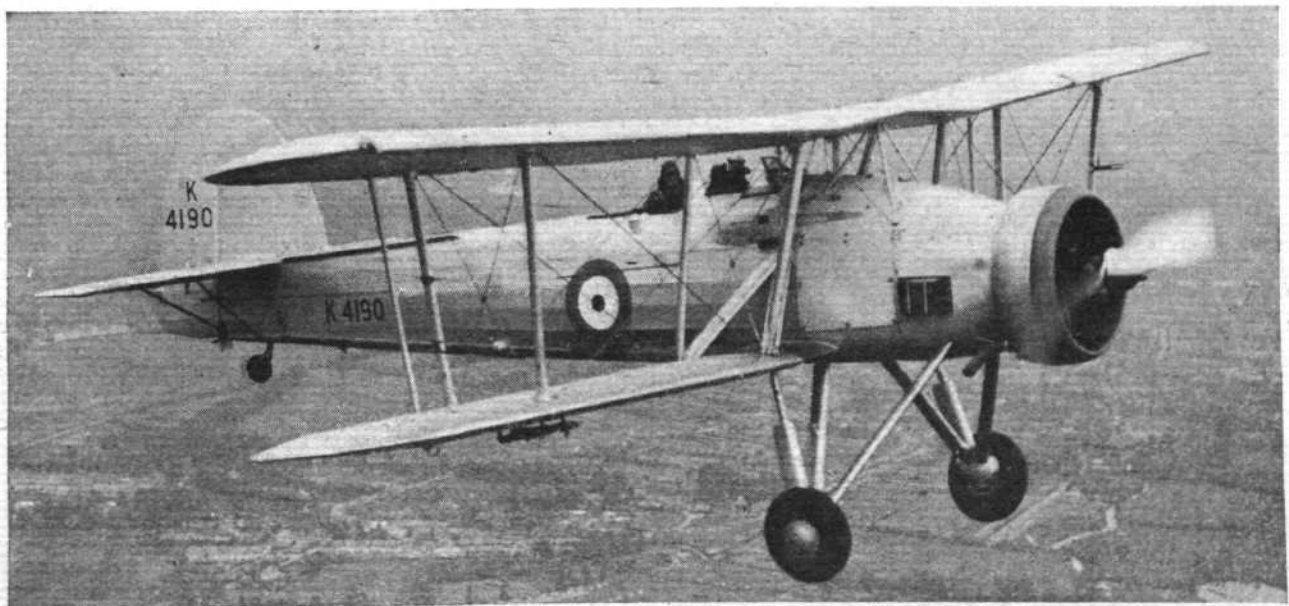
Flight Lieutenants.—F. W. P. Dixon, M.B.E., to Station Headquarters, Upper Heyford, 24.7.34. R. N. Kinnison, to Princess Mary's R.A.F. Hospital, Halton, 24.7.34. M. T. O'Reilly, to Station Headquarters, Worthy Down, 24.7.34. F. I. G. Tweedie, to R.A.F. Base, Leuchars, 24.7.34. C. H. Smith, to Station Headquarters, Amman, Palestine, 17.6.34. J. F. Ziegler, to No. 4 Flying Training School, Abu Sueir, Egypt, 20.6.34.

Chaplains Branch

Rev. R. Rees, to Headquarters, R.A.F., Halton, 18.7.34. For duty as Chaplain (C. of E.) on appointment to a Short Service Commission.

Accountant Branch

Flying Officers.—A. E. Fairs, M.C., to No. 26 (A.C.) Squadron, Catterick, 24.7.34. J. H. Glenn, to Home Aircraft Depot, Henlow, 24.7.34.



The Fairey Torpedo Spotter reconnaissance ship-plane (Bristol "Pegasus"). An order will probably be placed shortly for machines of this type to equip a squadron of the Fleet Air Arm. (Flight Photo.)

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

Record Glider Flights

Some long-distance glider flights have been accomplished at the fifteenth annual German glider meeting on the Wasserkuppe (Rhön). On Thursday, July 26, Herr Wolf Hirth set up a new world's record for gliders by flying across Germany from the Wasserkuppe to Görlitz, in Silesia, a distance of 225 miles. Next day, however, Herr Heini Ditmar beat this by flying 235 miles, from Wasserkuppe to Liban, in Czechoslovakia.

England-Australia Race and India

To aid competitors in the England-Australia Race, the Aero Club of India have prepared a pamphlet containing details of the local arrangements to be made for technical and other services, and describing the conditions peculiar to India. Weather conditions in October are described in detail, and various facilities which will be given to competitors are also mentioned. It is stated that the Government of India have exempted the competitors from all customs formalities.

Twenty-five Years Ago

From "Flight" of August 7, 1909.

"Our readers will remember that on June 20 one of the visitors to Juvisy, Count de Courmet, was so impressed with Delagrangé's flying that he promptly bought the aeroplane, and, ignoring the advice of his friends, proceeded to attempt to fly it, with disastrous results. Since then he has been making himself thoroughly acquainted with his Voisin machine, and on Monday last made a couple of circuits of the Juvisy course with perfect ease, and appeared to have his machine under complete control."



A GERMAN AFRICAN FLIGHT: Edgar Gotthold and his Junkers "Junior" fitted with an Armstrong Siddeley "Genet" engine, in which he recently completed a 15,500 mile flight from Germany to Africa and back. During this flight the "Genet" maintained the reputation of British engines by running faultlessly throughout.

Flying on Heavy Oil

A Potez 25 biplane with a new type of 14-cylinder engine driven by heavy oil has just made a successful flight in France with a load of two tons.

An Air Ministry Museum

According to an announcement in the 1933 report of the Advisory Council of the Science Museum, South Kensington, the Air Ministry is contemplating the formation of an air museum of its own.

Grierson's Arctic Flight

Mr. John Grierson, who met with a mishap in Iceland during his flight to Canada via the Arctic Air Route, left Reykjavik by steamer last week, en route for England with the damaged parts of his "Fox Moth" seaplane, which he hopes to have repaired in time to resume his flight next week.

Glider Train

The aerial "train" consisting of a biplane towing three gliders—to which we referred last week—left New York last Thursday for Philadelphia, Baltimore, and Washington. It was planned to "slip" a glider at each of these places, but owing to strong head winds and consequent shortage of fuel (for the "tug") all three had to descend at Philadelphia.

Victor Smith's Progress

Maintaining his title of "unluckiest airman," Mr. Victor Smith has failed in his attempt to beat the Cape-England record of seven and a half days. After leaving Loanda on July 28, no further news was received of his movements until Monday last, when it was reported that he had arrived at Bamako, Upper Senegal, that day. He continued on his journey the same afternoon, but up to the time of writing there is no more news of his progress.

French Air Force Reorganised

A law just promulgated makes important changes in the organisation of the French Air Force, or "Army of the Air," which will now be given independent status, with its own chief council, commander-in-chief, and mobilisation plans. Its organisation will be based on a series of territorial areas, each commanded by a general officer under the direct control of the Air Ministry. The Air Ministry will be responsible for general preparations for mobilisation, the plans being drawn up by the Ministers for Air, War, Marine, and Colonies in consultation. The Government will distribute the mobilised Air Forces, as may be required, between the Army, Navy, and General Reserve—the Air Force with the Army and Navy each being under the command of a general officer of the "Army of the Air."



HIGH SPEED COMFORT. The new Beechcraft in which Mr. W. Faust, Director of Aviation Sales, and Mr. H. White, Aviation Sales Manager, of the Socony-Vacuum Oil Co., Inc., will shortly be touring Europe. With a retractable undercarriage this four-seater has a top speed of 170 m.p.h. It has a 225 h.p. Jacobs engine. Flaps reduce the landing speed to 45 m.p.h.



LATEST CURTISS-WRIGHT AMPHIBIAN: Designed by and built under the supervision of Capt. Frank Courtney, this new amphibian, constructed by the Curtiss Wright Co., has a top speed of 151 m.p.h. and cruises at 125 m.p.h. Three wheels are employed in the undercarriage, one wheel being in the nose of the hull. Thus the machine lands in the same position on land as on water. A Wright "Whirlwind" engine of 330 h.p. is mounted as a pusher some distance away from the propeller, which is driven by an extension shaft. Four passengers, a pilot, and 240 lb. of baggage are carried.

Chinese Mission in Italy

A Chinese Aeronautical mission recently arrived at Brindisi with twenty Chinese officers who are to attend Italian flying schools.

Italian Air Programme

An official decree just published in Rome authorises Italy to spend £20,000,000 on the six-year air force replacement programme, announced by Signor Mussolini on May 26. £300,000 is also to be spent on the first instalment of the naval programme.

A Mid-Atlantic Meeting

Two machines on the South Atlantic air mail service passed each other in mid-Atlantic last week. They were the *Croix-du-Sud*, flying from Dakar to Port Natal, and the *Arc-en-Ciel*, flying in the opposite direction. A time may come shortly when this will become a common occurrence.

Pobjoy to Move to Rochester

Increasing business in Pobjoy engines has necessitated an expansion of that firm's works, and they are therefore putting up a modern factory on the municipal aerodrome at Rochester, to which it is hoped to move towards the end of this year. We understand that Short Bros. will have an interest in the company and that Mr. A. Gouge will have a seat on the Board.

Spanish Air Services

A decree just issued in Madrid orders the union of the services of military, naval, and civil aviation under a body called the Direction General of Aeronautics, to be under the control of the Prime Minister.

New Marconi Radio Beacon

Senator Marconi is demonstrating to wireless experts in Italy a new radio beacon with which he has recently carried out a number of very successful tests. This instrument transmits microwaves of less than 50 centimetres to ships or aircraft, the waves bringing into operation lights and bells which announce the presence of other craft cruising dangerously near.

U.S. Woman Pilot Killed

Frances Marealis, who, in company with Helen Ritchie, remained aloft for 9 days 21 hr. 42 min., was killed in a crash at Dayton, Ohio, recently.

Bristol Visitors in America

Capt. F. S. Barnwell and Mr. A. W. Grant, respectively chief designer and works superintendent of the Bristol Aeroplane Co., recently visited the works of the Pratt and Whitney Aircraft Co.

Duce Flies in Manœuvres

Flying in a Savoia-Marchetti S.66 flying boat, Signor Mussolini viewed the manœuvres of the Italian Fleet at Gaeta recently. The Duce himself flew the machine for some while.



BRITISH POWERED: The latest Savoia-Marchetti S.80 four-seater amphibian, with two Pobjoy engines mounted as pushers. A maximum speed of about 122 m.p.h. is obtained.

Diary of Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list:

Aug. 11. London-Newcastle Race (Newcastle-on-Tyne Ae.C.)
 Aug. 15. Air Tour of Italy.
 Aug. 17-Sept. 6. Copenhagen Aero Show.
 Aug. 18. Cotswold Aero Club Air Rally and Garden Party.
 Aug. 25. Liverpool and District Ae.C. Garden Party, Speke Aerodrome.
 Aug. 28-Sept. 16. International Touring Competition, Poland.
 Sept. 1-2. Cinque Ports Flying Club International Rally, Lympne.

Sept. 1-9. National Soaring Competition, Sutton Bank.
 Sept. 8. Official Opening of Walsall Aerodrome.
 Sept. 29. Leicestershire Aero Club "At Home."
 Oct. 6. London to Cardiff Air Race and Cardiff Ae.C. Garden Party.
 Oct. 7. Aviation Golf Meeting, Royal Porthcawl Golf Club, Porthcawl.
 Oct. 20. England-Australia Race for MacRobertson Prize.
 Nov. 16-Dec. 2. 14th International Aviation Exhibition, Grand Palais des Champs-Élysées Paris

CONTROLLABLE PITCH PROPELLERS

Possibilities and Advantages Discussed

By C. C. WALKER and R. M. CLARKSON

As most readers of "Flight" will know, Capt. Walker is a Director and Chief Engineer of the De Havilland Aircraft Co., Ltd. Mr. Clarkson is on the Technical Staff of that firm.

ABOUT seven years ago one of the present writers pointed out in *Flight** that there were large losses in climbing efficiency which could be recovered to a great extent by the use of controllable pitch propellers. Only aircraft of comparatively low speed were then dealt with, and the mechanical solution of the propeller problem did not seem to be imminent, so the matter was not carried into any great detail. The mechanical and production problems have now been solved, and the speed of aircraft has increased. The results to be expected can be ascertained from various sources, but particularly from an admirable series of the American N.A.C.A. reports which have made a concentrated attack on all propeller problems. There is little left to say on this side of the question, and in these notes a general survey of the way in which this development can influence the design of aircraft will be attempted.

The number of conflicting varieties involved was large enough before. This new feature makes it necessary to subordinate incidental effects and bring out the more fundamental ones. The fact, for instance, that there are regulations which might hinder the logical development of engine-cum-propeller will not be taken into account, on the assumption that regulations are subject to evolution as well as the things regulated.

Like any other vehicle, the aeroplane is intended for horizontal transport of passengers, freight, mail, troops, bombs, etc. The elevation of the load to the operating height is merely incidental. It is not the main purpose of the aeroplane. (In some cases of military aircraft the position is reversed, and vertical is more important than horizontal transport. These must be dealt with separately.) There is nothing peculiar to aeroplanes in this. The power which must be installed is thus fixed in just the same way as the need for starting and climbing gradients fixes the locomotive power of a train.

Take-off Considerations

Ability to take off with full load is the one thing which must be kept constant in any discussion of different kinds of aircraft. The effect of C.P. will be different for slow and fast machines, and for supercharged and normally aspirated engines. When any change is made in the thrust horse-power of a design—the take-off being kept constant—changes will follow which may involve every other characteristic—the landing speed, the pay load, the cruising speed, the percentage structure weight, the range, the reserve power, etc., etc. In making comparisons the take-off capability and range in miles can be kept constant and the other factors varied, but before going into any detail a few general remarks may be made. In this country a civil aeroplane must demonstrate its ability to reach a certain height in a certain distance from the start without wind. To guard against lightly loaded low horse-power machines getting certified, which could clear the screen but might not have enough reserve power, there is also a minimum rate of climb which must be obtained. A fixed-pitch propeller is pitched for maximum speed, and is also efficient at cruising speeds. For accelerating over the ground and climbing, it attacks the air at too coarse an angle, is therefore inefficient, and, in addition, holds down the engine r.p.m. and power. The faster the aero-

plane, the coarser the pitch, and the worse these effects become.

If the speed of the aeroplane is more than about 180 m.p.h. there will not only be a serious diminution of the load per installed b.h.p. with which the machine can be taken off, but a difficult regime is entered, owing to the effect of unduly low r.p.m. at full throttle on the engine. If there is any reasonable alternative, it is a waste of energy to develop engines and special fuels merely to stand up against this kind of abuse, for it can only be described as abuse if it has become avoidable.

The chief advantages of controllable pitch may be enumerated thus:—

- (1) It makes possible the development of engines for the directly useful part of their duty.
- (2) It permits the power taken from the engine when cruising to be increased without increasing the r.p.m. beyond whatever limit is desired.
- (3) In allowing the engine and aircraft to work efficiently together during take-off it permits new and favourable combinations to be produced.

Improved Cruising

No further explanation of the first of these points is required. It means that high-octane fuels and palliatives can be turned to good account instead of being used merely for preventing detonation, etc., on the ground. This applies with greater force to supercharged engines. Closing up the r.p.m. range at full throttle is a big advantage.

So far as the second point is concerned, there is a limitation of r.p.m. used in cruising which may be fixed by the Type Test (a lower limit might be advised by the engine constructor for continuous work). If this limit is correct for low-altitude flying, the power taken from the engine will decrease at altitudes because the throttle cannot be opened correspondingly without incurring an increase of r.p.m. beyond the prescribed limit. Since altitude flying is faster for the same petrol and power consumption, and since, further, it might be economic in any case to work at higher pressures for the same r.p.m., the ability to increase pitch and throttle setting is extremely valuable. The following table will illustrate this point for an aeroplane with a ceiling of about 20,000 ft.

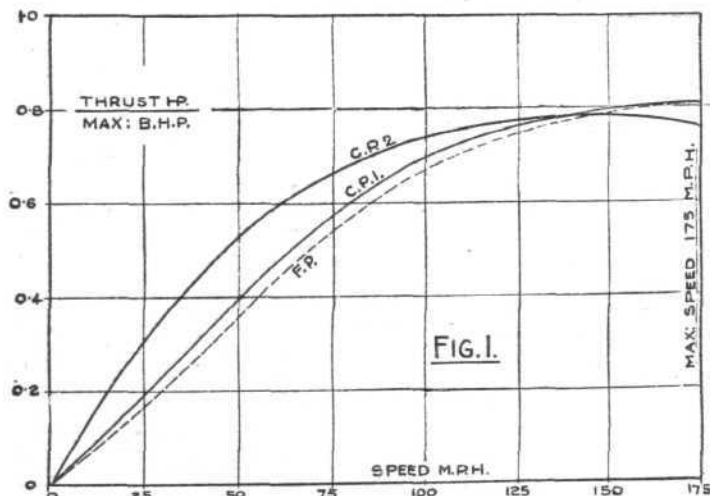
	1. Fixed Pitch	2. Controllable Pitch
Speed at maximum permissible r.p.m. at ground level.	170 m.p.h.	168 m.p.h.
Cruising condition	Throttle fixed by cruising r.p.m. limitation.	Power kept at 75% of max. output, r.p.m. held down by propeller.
Cruising speed and power, low altitude.	145 m.p.h. 66% max.	151 m.p.h. 75% max.
Cruising speed and power at 5,000 ft.	143 m.p.h. 56% max.	158 m.p.h. 75% max.

The speed at maximum permissible r.p.m. has been inserted merely to show what kind of aeroplane is being used as illustration. It has no other significance and is never made use of in civil aircraft. If any "maximum permissible" condition for short periods were available, it would be wanted for take off and climb, and this is the only logical application of such a condition for civil flying. It would be correct to describe the above aircraft—which are identical except for the propeller—as having cruising speeds of 143 and 158 m.p.h. at 5,000 ft. respectively. The figure

* See *The Aircraft Engineer*, January 27, 1927, "Climbing Efficiency of Aircraft," by C. C. Walker.

of 75 per cent. of full power may seem to be on the high side, but much depends on the conditions of service in relation to the Type Testing of the engine and on the consequent meaning of the term "full power."

A third advantage of C.P. mentioned above—namely, the power of making new and favourable arrangements of existing features—is less simple. In the first place, a C.P. propeller blade may be designed for speed and have pitch twisted off for climb, or it may be designed for climb and have pitch twisted on for speed. It is needless to say that in either case the loss of b.h.p. due to low r.p.m. on the take off can be wholly recovered by the C.P. propeller, but in the case of the speed propeller only a little pitch can be taken off without exceeding the prescribed r.p.m., so that there will be little additional gain in propeller efficiency. If, however, the climb propeller is used, it can be of relatively high efficiency on the climb and will fall somewhat for speed. The best compromise is rather in the direction of the climb propeller with only a small loss of efficiency at speed. This point, together with the amount of gain in thrust horse-power to be expected in a fairly high-speed machine from the use of the C.P., is illustrated in Fig. 1. In considering the amount of gain possible a fairly practical view must be taken, for, with a free hand about gear reductions, very large fractions of the maximum thrust horse-power could be obtained when climbing by the use of C.P. It will be seen from Fig. 1, which relates to a 175 m.p.h. machine without gear reduction, that the F.P. condition is a very bad one, there being, for example, only about 15 per cent. of the maximum thrust horse-power available at 20 m.p.h.—an important part of the take-off, where a large part of the available run might be used up. It will also be noticed that with C.P. a large gain in climb is obtained with a small loss in speed. Two rather extreme cases of blade design for C.P. are illustrated in the curves.



Curve F.P. represents a fixed pitch propeller designed for 175 m.p.h., Curve C.P.1 a controllable pitch propeller designed for 175 m.p.h. Pitch is twisted off at lower speeds to maintain constant r.p.m., and Curve C.P.2 is for a controllable pitch propeller designed for 75 m.p.h. Pitch is twisted on at higher speeds and off at lower speeds to maintain constant r.p.m.

The best way of illustrating what might be gained in the aircraft is to take for comparison an ordinary aeroplane with fixed-pitch propeller and then examine several different methods of taking advantage of the extra thrust horse-power due to C.P. at low forward speeds. The results will not necessarily show any aircraft that would actually be designed. There are a number of variables all of which would be affected by the change, and it is therefore important to state clearly that these comparisons are based on the same ability to take off over an obstacle in each case, and they have the same range in miles. The basic aeroplane may be assumed to be a biplane of fairly good performance and moderate carrying capacity. The different

cases taken show trends which may be taken by using C.P. The case of merely applying C.P. to the basic machine has not been considered, because, by hypothesis, the take-off is already adequate, and the only other advantage—namely, the ability to cruise at a higher power output at moderate r.p.m.—has already been illustrated above.

EFFECT OF C.P. ON PERFORMANCE FOR EQUAL TAKE-OFF AND RANGE

	Fixed Pitch. Basic M/c.	Controllable Pitch			
		Case 1. Increased Loading	Case 2. Smaller Engine	Case 3. Same Loading, Increased Size	Case 4. Same Pay Load, Higher Speed
Tare weight, lb./b.h.p. ...	7.75	8.33	10.27	9.39	7.65
Pay load, lb./b.h.p. ...	3.11	4.64	4.82	4.92	3.11
Total wt./b.h.p. ...	12.50	14.75	17.27	16.25	12.30
Speed at max. permissible r.p.m. at ground level, m.p.h. ...	170.0	165.5	142.5	151.0	203.0
Cruising speed at 5,000 ft. (r.p.m. limitation), m.p.h. ...	143.0	—	—	—	—
Cruising speed at 5,000 ft. (75% max. b.h.p.), m.p.h. ...	—	154.0	133.0	140.0	190.0
Passenger-miles per gal. ...	53.8	70.0	62.2	67.2	57.7
Relative operating cost per passenger-mile ...	1.0	0.7	0.89	0.75	0.84

With the ability to use more of the maximum thrust power for take-off, the pay load can be increased. It is obvious that alternatively the installed power can be reduced, or a smaller, faster aeroplane can be built round the same engine with equal take-off facility. Taking these in the order shown above—

Case 1. The aeroplane remains the same size; the total weight is increased until the take-off with C.P. is the same as the basic machine. This results in a large increase of paying load after allowing for the increased structure and propeller weight. The speed would be very slightly lower. The landing speed would be higher, ceiling and reserve power rather lower. Cost per passenger-mile much lower. Landing speed, if too high, is capable of reduction by flaps, etc.

Case 2. The basic aeroplane with a smaller engine; sufficient power to take off the original paying load with C.P. Table 2 shows the characteristics, the most important of which is a large increase of paying load per horse-power, accompanied by a decrease of speed.

Case 3. The basic aeroplane with size increased to maintain the original landing speed with the greater load permitted by C.P.

Case 4. The basic aeroplane is reduced in size so that the original pay load may still be taken off over the screen with C.P. The higher loading and landing speed is dealt with by flaps, etc. The speed is much higher. The cost of a passenger-mile is actually lower.

In the various cases dealt with above due allowance is made for variations of structure weight, extra weight of propellers and petrol where necessary. A word of caution is necessary in looking at these figures, for they are not supposed to represent what would actually be done in designing an aeroplane, but only the way in which the fundamental characteristics tend to vary. As an example, the landing speed of Case 1 is too high, and, therefore, if it were desired to move away from the basic example in this direction, the result might have to be a flapped (or similarly dealt with) monoplane with different structural and aerodynamic characteristics altogether. In all these cases, therefore, except No. 4, in order to expose the various trends a biplane with non-retractable undercarriage has been considered. In Case 4 it has been recognised that the basic landing speed must not be exceeded, and if the advantages of C.P. are to be taken out in the form of increased speed slow landing devices must be used. It is also fairly certain that Case 4 would have a retractable undercarriage, since this unit would be a larger proportion of the total drag. This has, therefore, been allowed for, and these things put Case 4 into a different and non-comparative category. Some degree of generalisation is necessary in order to put a value on

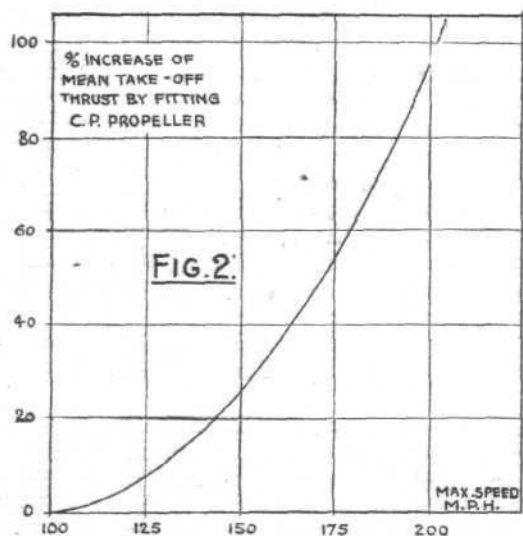
these things, but when the variables are so many and so interwoven it must be admitted that a variety of interpretations is possible.

In comparing the basic machine with Case 4, the latter has been given a retractable undercarriage and the former has not. It might therefore be supposed that these two cases do not represent a difference between what can be done with and without C.P. This, however, is only partially true, for it is unlikely that the basic machine would be fitted with a retractable undercarriage and certain that the Case 4 machine would be so fitted, and since the aeroplane of Case 4 is only made possible by C.P., it is of interest to make this comparison.

It may be suggested that this machine could alternatively have been produced by fitting bigger engines and using fixed pitch. An aircraft of this kind would carry a much smaller load per h.p. at a higher maximum speed, and might have to take off throttled if reasonably efficient propellers were fitted, thus reducing the load still further. A hopeless tangle would soon be reached, however, by varying too many factors at the same time. By keeping to one power unit, one take-off ability, and one range, there should emerge a reasonably clear comparison.

It has been assumed that machines fitted with C.P. propellers can be cruised at 75 per cent. of the power developed at maximum permissible r.p.m. This assumption does not mean much until the type test conditions are defined, but it can be taken as meaning that more power can be used for cruising if the r.p.m. can be held down by C.P.

The basic aeroplane which has been taken for comparison



is of moderately high speed. The value of C.P. increases as the design speed of the aeroplane is increased. Since it would be impossible in a short space to display the results to be expected for various design speeds, the way in which the value of C.P. propellers varies with speed is shown in Fig. 2 as the increase of thrust during take-off obtainable by a C.P. propeller designed rather for climb than speed plotted against design speed of the aircraft. The minimum pitch setting is adapted to 100 m.p.h. throughout. If a lower speed had been taken some gain would have been shown for the slower machines.

One or two questions of general interest can now be answered. Is it worth while fitting C.P. propellers to existing transport aeroplanes? The answer would in general be a decided negative, for the result is a decrease of paying load and an increase in cost caused by the weight and cost of the propellers. Against this is the ability to cruise at a higher speed by using such extra power as the engine maker may sanction while keeping the r.p.m. down by increased pitch. It is, of course, assumed that the aeroplane is already satisfactory as regards take-off, ability to fly with one engine out, etc. Is it worth while fitting C.P. to a light aeroplane of low speed? Again the answer is obviously a decided negative, but it must be qualified by saying that if a new design with a gear reduction were made, a substantially smaller engine could be installed to do the same job with C.P. This advantage

could be obtained by the combination of gear reduction with C.P., but not by gear reduction alone.

A word is necessary as to the validity of the various statements made and figures given in the course of these remarks. So far as the properties of the propellers are concerned, the information is mainly derived from N.A.C.A. Reports based on full scale tests in a large wind tunnel with the propeller driven by its own engine installed in an aeroplane. There does not seem to be room for large errors in the deductions from these. The de Havilland Company wished to make a sort of spot check on the interpretation of these figures recently and, therefore, designed two wooden propellers for top speeds of 230 and 165 m.p.h. respectively to be tried on a Leopard Moth ("Gipsy Six"). Some preliminary trials have shown that leaving off the whole of the paying load with the high-speed propeller does not allow of as short an unstick distance as in the case of the 165 m.p.h. propeller with full load, the ratio of the total weight for equal unstick being 1.28:1. This, of course, is not the same thing as clearing a barrier, and the fact that the two propellers are not of quite the same diameter, etc., prevents direct application of results to C.P. It is, however, a quite adequate check on the harmful results of big pitch diameter ratio on take-off and a very clear indication of the gain obtainable by an alteration of pitch by an amount which would be realisable in practice with C.P. propellers.

Figures have been given showing the relative cost of performing a passenger mile. It must be explained that these figures take into account obsolescence, insurance, maintenance of engine and aircraft, petrol, oil and piloting. The variations shown are based on the assumption that the cost of petrol is 36 per cent. of the total of the above-mentioned charges on the basic aeroplane.

There is, unfortunately, no space to deal adequately with that type of military aeroplane which is not concerned with transport of the horizontal kind. There is no take-off limitation as a rule in such cases, as the excess of b.h.p. near the ground is so great that the low thrust horse power may be no drawback. The various points dealt with may be summed up as follows:—

Ability to get a better static and climbing thrust from a given engine opens up all kinds of possibilities. The general result is that C.P. enables greater loads to be carried, and enables good loads, not otherwise obtainable, to be carried on high-speed aircraft. It was shown above that the paying load (Case 3) could be increased by 58 per cent. (say from 10 passengers to 16) at a lower speed, or that the same load could be carried 47 m.p.h. faster and at a lower cost using the same engines.

Very little can be obtained by fitting C.P. to existing aircraft beyond the ability to use more cruising power and the means of preventing abuse of the engine by low r.p.m. at full throttle on the ground. The use of special fuels can also be avoided or devoted to more useful ends.

The real advantages have to be designed for in the first place, and very deceptive results can be obtained by tests on aeroplanes of low weight per horse-power, because the advantages of C.P., being all at the low speed end of the scale are easily masked in such machines.

It must be admitted that it is extremely difficult to give cut and dried comparisons which are not open to question in a matter such as this where so many variables are involved, but the only way to examine the question is to suppose new designs created to utilise new facilities. The C.P. propeller is to the aeroplane what the gear box is to the car. It can be imagined that the application of a gear box to a car designed to do the best it could with a single gear would be the least favourable method of making use of the combination.

In any transport aeroplane the maximum permissible power which can be utilised for short periods should be available for the take-off. It is required for no other purpose. It is to be hoped that there will be no military legacies to civil aviation in any future legislation which affects the use of C.P. propellers.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

AIR MAILS

From the Viscount Elibank, D.L.

[2950] The decision of the Postmaster-General to inaugurate air mails between a number of cities in this country is a step in the right direction. Not only is it important as a direct contribution to industrial development, but also as establishing a principle which those of us who are interested in air development have been emphasising for some considerable time.

The efficiency of the air industry and, as a corollary, of our air defences, depends very largely upon the prosperity of civil aviation. Assured freight is the royal road to a solution of the problem, and the Postmaster-General himself has now stated that "in organising these new air mail services our hope is to make an important contribution to the development of aircraft and air efficiency in this country."

It is to be hoped, however, that he will without delay extend these benefits of air mail facilities at a low cost to all parts of the Empire.

A year or two ago serious objections were raised to internal air services. The success of the Inverness-Orkney experiment has been so overwhelming that all fears have been banished and the new services have been decided upon. I understand that three thousand letters a day have been carried on the Orkney route without any need of surcharge.

The success of the new routes now announced is inevitable. So also would be that of Empire routes—and I have urged repeatedly in the House of Lords that our air development must be regarded not as a national but as an Imperial necessity.

Might I suggest that the Postmaster-General should inaugurate an experimental Empire service of low mail rates between, say, England and the East African territories? He would find, I am sure, that the results both in finance and in industrial benefits would amply justify the sending of all mails to the territories by air.

Sir Kingsley Wood is to be congratulated on going as far as he has done, but he should not be satisfied until he has pursued his policy to its logical conclusion and given us a low flat rate for all Empire mails.

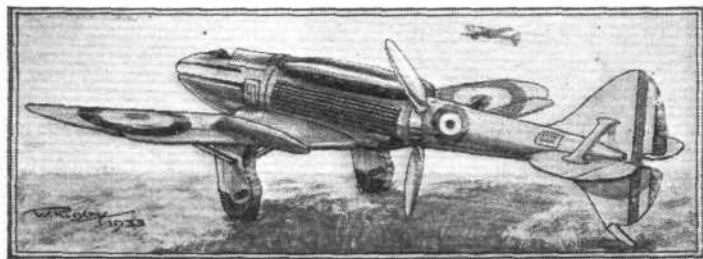
London, S.W.7.

ELIBANK.

FIGHTING VIEW

[2951] Herewith a sketch which you may be interested to examine, especially as the general principle of a propeller of this type seems to have been tried already in Italy and the U.S.A. with interesting results.

Though doubtless open to many points of severe criticism, I drew this some time ago as an attempt to visualise the perfect interceptor!



Visibility is at its highest, and the pilot would go into action with the cowling at his back drawn over his head, thereafter operating, and firing, through double eye lenses, or binoculars. The armament would be machine guns in pairs, two firing forward and two out at tail (note rudder cut away); in addition to forward M.G.s there is a pair of heavier calibre guns, or incendiary rocket tubes against airships. Finally, from two vents connected with exhausts, either a smoke screen or a gas attack could be made, the same being rendered all the more effective by the curtaining effect produced by being whirled into stream through prop.

THE DEATH OF MR. H. GLAUERT

The British aviation world was shocked to read in the newspapers of the untimely accident which caused the death of Mr. H. Glauert near Aldershot last Saturday. Mr. Glauert, his wife and three children were watching the Royal Engineers blowing up tree stumps, and a piece of wood hit Mr. Glauert

The undercarriage semi-retracts, but the foils are not necessarily intended to represent, especially in their present perspective, the last word in proficiency!

Streatham, S.W.16.

W. RIGBY.

A CORNER TURNED

[2952] Your editorial under this title reminds me that on December 13 last I ventured to suggest in a letter you were good enough to print, that the inauguration of the air route to Australia should coincide with the establishment of the practice of sending all first-class mails by air at a low flat rate.

This idea does not sound quite so far-fetched now as it did then, in view of the enterprise of the P.M.G.

The recent announcement that the P.M.G. has appointed Rear-Admiral Sir Murray Sueter, M.P., and Major General Sir Frederick Sykes to the Post Office Advisory Council to act as members of the Air Mail Panel of the Council is almost too good to be true.

December has been announced as the earliest date we can expect the first Australian Air Mail to leave Croydon, so there is still time.

The air liner, or liners, making this historical flight may carry a heavier Christmas mail than anyone could have dared hope for twelve months ago.

W. L. NAYLOR.

Marlow, Bucks.

THE PERSONAL ELEMENT

[2953] In *Flight* of July 26 your leader, under the heading of "Decontrol," deals with the Report of the Gorell Committee.

You say: "The Report points out that by far the greater number of accidents result from causes which have nothing to do with design or construction of the aircraft." This may be true. If it be true, surely it is due to the rigid legislation in force and the close inspection exercised by the Air Ministry and the A.I.D.

Whilst deploring "red tape" and the certain amount of hindrances to design, it must in fairness be confessed that it has done its share in placing the British aircraft and engine in an enviable position as regards reliability.

Bognor, Sussex.

REGULAR READER.

IRISH MONOPLANE TESTED

From Mary Lady Heath:

[2954] I beg to reply to the letter signed by "A Licence" in your issue of July 26. In this he states that "It is doubtful whether a C. of A. would be renewed for this machine in England, taking all the circumstances of the case into consideration. As up to the present the writer has never known of any of the strict detail inspection which is to be found across Channel, and called for by the A.I.D. before certificates are recommended by them. Finally, no aircraft or aero engines have been designed or built in Ireland that could fly, except Harry Ferguson's of the old days."

In reply I would like to state that to my detailed knowledge the controlling body in Ireland is as severe, if not severer, than the English A.I.D. I have actually a case under my hand in which a part of a machine passed out by the A.I.D. in England has been condemned as unairworthy by the Asst. Aeronautical Engineer under Industry and Commerce. This has cost me several pounds of expense.

Dublin.

G. MARY HEATH.

[On the same subject we have received a letter from our Dublin correspondent, who points out that when Mr. Joseph Gilmore crashed his Civilian Coupé the machine was wrecked beyond repair, the whole of the fuselage was re-designed, and it was not a question of a renewal of a C. of A. but of a C. of A. for a new machine. Our Dublin correspondent further states that he does not remember one accident in the Irish Free State which could be attributed to faulty workmanship or careless inspection.—Ed.]

AIR POST STAMPS

By DOUGLAS ARMSTRONG

(Editor of "Stamp Collecting," etc.)

More British Air Mails

Extension of the British inland air mail service over eight new routes this month will doubtless result in a rush for "first flight covers" by air post enthusiasts, but there the interest is likely to end unless the Postmaster-General should see fit to remove his ban upon special vignettes. Some of the operating lines may be disposed to follow the example of Highland Airways, Ltd., by providing distinctive etiquettes for the benefit of collectors, and it is understood that a new and improved form of Post Office air mail label will be introduced about the same time. After that, in the absence of official backstamping, there will be nothing to distinguish letters sent by air from those despatched by rail, road or sea. Nothing is simpler than to affix an air mail label to an ordinary letter *after* it has been through the post with the object of making it saleable as an air post cover, and the only way in which this form of deception could be overcome would be if the air mail label was allowed to be affixed adjoining the postage stamp, so that both the stamp and the label received the postmark at the same time. It seems doubtful, however, whether the powers that be would countenance such a departure from precedent.

The new British air mail label is a more elaborate affair than any that has gone before. Printed in blue, the recognised international colour, it has a lined instead of a solid background, with a winged insignia in the Egyptian style surmounting the inscription, "BY AIR MAIL—Par Avion" in two lines.

Collect Air Mail Labels Now!

Now that H.M. Postmaster-General has shown the way by undertaking the carriage of mails by air without extra charge it seems probable that other countries may be induced to follow suit, so far as internal air routes are concerned. It must not be forgotten, however, that America tried the same experiment some years ago, but was forced to abandon it on account of the high cost of operating the air mail service over long distances. Nevertheless, it is not unlikely that some of the European nations may shortly adopt a similar policy, with the result that the number of special air mail stamps will be considerably reduced. The natural corollary must be an increase in the collecting of air mail labels of all nations, as distinct from stamps of specific denomination. Already a number of far-sighted collectors are gathering together subsidiary collections of air mail etiquettes which to-day can be picked up for the proverbial song, but when the vogue develops are calculated to be in keen demand at greatly enhanced prices.

Latest U.S.A. Air Stamps

Consequent upon the reduction of the American domestic air mail fee from 8 cents to 6 cents with effect from July 1, the 8c. air stamp has been replaced by one of the lower denomination printed in bright orange but otherwise identical as to design and format. A stamped 6 cents air mail envelope is also to be provided.

The Washington Bureau of Engraving and Printing has also in active preparation a combined air mail and special delivery stamp of 16 cents value which it is expected will be taken into use early in August. The main feature of the design is the American Eagle with wings outspread, the words "AIR MAIL" and "SPECIAL DELIVERY" being inscribed vertically upon either side.

New Air Post Stamps

Additions to the air stamp collections have been few and far between this month past. Syria included in an elaborate series commemorating the anniversary of the founding of the republic a set of ten values for air post purposes illustrating an aeroplane over the town of Bloudan, designed by M. S. Namani and beautifully printed by the Parisian Institut de Gravure. Guatemala sends us some more emergency air stamps extemporised by overprinting on the ordinary postage types of 1929 the 2 centavos carrying the inscription, "Aereo Interior 1934" and the 5c. and 15c. "Aereo Exterior 1934."

Another Rocket Post

A purely private vignette depicting a rocket in flight to an island printed in red for letters and in green for printed matter has been provided by the promoters of a second British rocket post experiment that was carried out between the islands of Lewis and Scarpe in the Hebrides on or about July 27 and 28. These unofficial "stamps" bear the designation "Western Isles Rocket Post" and are being offered

unused for 2s. 6d. the pair. Something like 4,800 missives were proposed to be shot between the two islands, and four of the letters are said to have been addressed to H.M. the King. Apart from their interest as pioneer experiments it cannot be too strongly emphasised that neither the post nor its stamps have any status, official or even semi-official.

FIRE-RESISTING GLOVES

Orders for a stock of fire-resisting gloves have been placed by the Air Ministry with Bells Asbestos Engineering Co., of Slough, after the wearer had been put through an "ordeal by fire." These asbestos gloves form part of the standard fire-fighting equipment of the Royal Air Force, and may give invaluable service in the rare cases when aircraft take fire after a crash. Before they were accepted by the Air Ministry stringent tests were applied, both by the manufacturer and the Air Ministry, to satisfy requirements regarding their fire-resisting properties and ease of manipulation. One of the tests to which the firm subjected the wearer was to pick up a piece of blazing coal from a fire and hold it in his gloved hand until the coal had completely burned out and cooled. Following this the gloves, known as the "Bestobell," were tested by the firm to show that the texture was sufficiently fine to allow the wearer to manipulate a small nut and bolt which were red hot. Official tests, which came later, required that the gloved hand should be placed over the forced draught of a blacksmith's forge and remove a piece of red-hot coal from the air jet. No undue heat was felt. Other tests applied by the Air Ministry were that the wearer should: Grasp a $\frac{1}{2}$ in. steel bar after it had been heated to cherry red, and hold it until the temperature of the bar dropped to black hot; hold the gloved hand in the forced draught of a forge fire for a period of thirty seconds; take a $\frac{1}{2}$ in. rod, red hot, place it in a vice, and then bend it with his gloved hand. The tests were passed satisfactorily, and the man had not even scorched his hands.

N.B.M. FOR RACING

It is a great help to flying people when they can be assured that they can use ordinary petrol as supplied to motorists without losing any performance from their engines. That this is so in the case of National Benzole Mixture is shown by the fact that the first three in the S.B.A.C. Trophy Race at Bristol used this spirit.

A NEW SILENCER

Considerable advance in silencing aero engines is claimed for the Vokes-Blanvac silencer which is made by C. G. Vokes, Ltd., of Putney. It operates on the principle of turning the pulsating movements of the exhaust gases into a steady stream by whirling them through baffle-cones inside the silencer. Satisfactory tests have been carried out at the Royal Aircraft Establishment at Farnborough. We hope to have an opportunity of testing this silencer ourselves shortly.

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda. No. 1577. Westland Hill Pterodactyl, Mark IV. Part I.—Experiments on One-Fifth Scale Model. By A. S. Batson. Part II.—Full Scale Tests. By J. E. Serby. July, 1933. Price 1s. 6d. net. No. 1582. Aileron Angles in High Speed Manoeuvres with Single Seater Fighters. By B. V. Williams and J. H. Hartley. September, 1933. Price 6d. net. London: H.M. Stationery Office, W.C.2.

Electric Resistance Welding. New Process Welders, Ltd., Scott's Road, Southall, Middx.

Anuario de la Gran Bretaña, 1934-35. Price 2s. 6d. net. Trade & Travel Publications, Ltd., 14, Leadenhall Street, E.C.3.

Aluminium Sheet Metal Work, 1934. The British Aluminium Co., Ltd., Adelaide House, E.C.4.

Coupe Deutsch de la Meurthe. Regulations for 1935.

PATENT AERONAUTICAL SPECIFICATIONS

Abbreviations: Cyl.=cylinder; i.c.=internal combustion; m.=motors.

(The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1932

Published August 9, 1934

32326. VICKERS-ARMSTRONGS LTD. and J. P. WATSON. Bomb-dropping sights for use on aircraft. (413,338.)

APPLIED FOR IN 1933

Published August 9, 1934

1314. BRISTOL AEROPLANE CO. LTD., A. H. R. FEDDEN and F. M. OWNER. Cooling arrangements for the cylinders of internal-combustion engines used on aircraft.

1315. BRISTOL AEROPLANE CO. LTD., A. H. R. FEDDEN and L. F. G. BUTLER. Gun actuating or controlling mechanism for use in association with aircraft engines. (413,350.)

11486. L. R. TOWER and BOEING AIRPLANE CO. Means for controlling aircraft. (413,458.)

12937. WILMOT, MANSOUR & CO. LTD. and J. W. BRISTOW. Toy aircraft. (413,466.)

33635. C. DORNIER. Aircraft of the helicopter type. (413,336.)